



**PORT TOWNSEND PAPER CORPORATION
NOVEMBER/DECEMBER 1993
CLASS II INSPECTION**

September 1994

Water Body No. WA-17-0030

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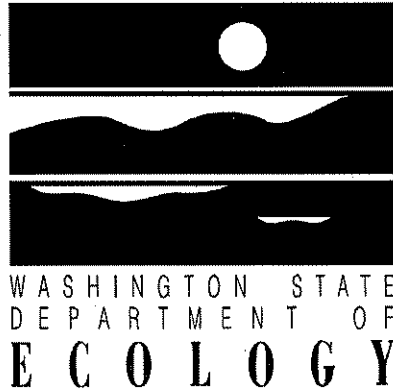


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November/December 1993
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by
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Environmental Investigations and Laboratory Services Program
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- Appendix H. VOA and BNA Scan Tentatively Identified Compounds (TICs) - Port Townsend Paper, 1993.
- Appendix I. Gossary of Terms - Port Townsend Paper, 1993.

Abstract

A Class II Inspection was conducted at the Port Townsend Paper Company pulp and paper mill just south of Port Townsend, Washington, on November 15-17, 1993. Related sediment sampling was conducted December 15. The combined process water and sanitary discharge met all NPDES permit requirements. The sanitary effluent was also well within all permit requirements. All VOA and BNA compounds found were within applicable EPA water quality criteria. No pesticide/PCB compounds were found in the influent or effluent. Five priority pollutant metals were detected in the effluent. Copper was found in an estimated concentration of over four times Ecology water quality criteria. The fathead minnow chronic test and bivalve larvae test demonstrated sensitivity to the pulp mill effluent.

No VOA compounds were detected in the sediment samples. All BNA compounds and metals detected were below Ecology Marine Sediment Quality Standards. No toxicity was found in the Microtox test. Amphipod test results found one sample equal to 25 percent toxicity.

Summary

Wastewater

The 001 (combined process water and sanitary discharge) flow measuring device was not accessible. Difficulties in operation and accessibility prevented Ecology from verifying flow for the sewage treatment plant (STP) and the aerated stabilization basin (ASB).

Discharges through Outfall 001 and the STP effluent were well within all permit requirements during the inspection. 95 % of BOD₅ and 97 % of TSS were removed from the process water. The STP was removing 95 % of BOD₅ and 96 % of TSS, and was nitrifying.

Comparisons between Ecology and pulp mill samples analyses showed close agreement.

All VOA and BNA compounds in the 001 effluent for which there are EPA water quality criteria were found below the criteria. No pesticide/PCB compounds were found in the influent or effluent. Five priority pollutant metals were detected in the effluent. **Copper was found in an estimated concentration of over four times Ecology acute marine water criteria.**

Daphnia magna and rainbow trout survival tests revealed no acute toxicity in 001 effluent. The fathead minnow chronic test showed reduced growth (NOEC 25 %) and survival (NOEC 50 %). Bivalve larvae (*Mytilus edulis*) showed significant mortality (NOEC 8.75 %) and considerable abnormality (NOEC 4.38 %). This degree of toxicity to bivalve larvae is typically seen in pulp mill effluents.

Sediments

The two sediment samples collected near the diffuser consisted primarily of silt. The background sediment sample was primarily sand, as is typical of sediments in the vicinity of Glen Cove. It appears that the silt may be related to the facility outfall.

No VOA or pesticide/PCB compounds were detected in any of the sediment samples. No BNA compounds were detected in the background sample. Up to seven BNA compounds were detected in the two samples near the diffuser, all at concentrations below Ecology Marine Sediment Quality Standards.

Metals concentrations in the background sediment sample averaged approximately half of the concentrations of the samples taken from near the diffuser. All metals detected were in concentrations well below Ecology Marine Sediment Quality Standards.

No toxicity was found by the Microtox test in any of the three sediment samples. **The amphipod test showed significant toxicity in the samples collected near the outfall, but**

actual toxicity did not exceed 25 percent, so the sediments would not be designated as having an adverse effect. Significant toxicity in amphipod tests is typical of sediments near pulp mill outfalls. It is unclear whether the lack of toxicity in the amphipod test for the background station is in part a result of the larger grain size of the sample.

Recommendations

- The concentration of copper in the 001 effluent should be verified. The effects on receiving water should be assessed.
- Process wastewater and STP flow meter maintenance records should be reviewed to assure the meters are routinely calibrated.
- Reduce chlorine residual in the STP effluent to less than or equal to 1.0 mg/L if adequate disinfection can still be attained.

Introduction

A Class II Inspection was conducted at the Port Townsend Paper Corporation (PTPC) pulp and paper mill just south of Port Townsend, Washington, on November 15-17, 1993 (Figure 1). Conducting the inspection were Teddy Le of the Ecology Industrial Section, and Steven Golding of the Toxics Investigations Section. Thor Sorenson, Environmental Manager, represented PTPC. He left PTPC subsequent to the inspection. Also, sediments were collected in Glen Cove. Bernie Strong, Teddy Le, and Steven Golding collected the sediment samples on December 15.

Facility Description

The mill produces an average of roughly 550 tons of unbleached kraft pulp and paper per day. The current mill capacity is 650 tons per day. The mill wastewater is treated by a primary clarifier followed by secondary treatment in an aerated stabilization basin (Figure 2). The effluent along with sanitary wastewater effluent from an activated sludge sewage treatment plant (STP) is discharged via Outfall 001 through a high-rate diffuser at a depth of roughly 40 feet. Discharge from outfall 001 is into Glen Cove about 1,200 feet from shore. The mill also discharges non-contact cooling water into Glen Cove from two outfalls (002, and 003, respectively) located near the southeast edge of the pulp dock (Figure 2). Discharge from the three outfalls is regulated by National Pollutant Discharge Elimination System (NPDES) Permit No. WA000092-2.

Objectives

Objectives of the inspection included:

1. assess compliance with NPDES permit limits;
2. verify NPDES permit self monitoring, split samples with the permittee to determine the comparability of sampling methods and laboratory results;
3. evaluate STP efficiency;
4. assess effluent toxicity with bioassays and pollutant scans; and
5. assess impacts to receiving water sediments with chemical analyses and bioassays.

Procedures

Ecology collected composite and grab samples of influent process water (Inf), effluent from the primary clarifier (Clar), and final effluent (Eff) from the aeration stabilization basin (ASB). Influent and effluent from the STP (Inf-S and Eff-S) were also collected. PTPC collected final effluent and STP influent and effluent composite samples (Table 1, Figure 2). A glossary of terms appears in Appendix I.

Sediment samples were collected near the Port Townsend outfall by Ecology (Table 1, Figure 1).

Ecology and PTPC sampler configurations and locations are summarized in Figure 2 and Table 1. A more detailed description of sampling procedures appears in Appendix A. Sampling times and parameters analyzed appear in Appendix B. Ecology analytical methods and laboratories performing the analyses are summarized in Appendix C. Quality assurance cleaning procedures are included in Appendix D.

Results and Discussion

Wastewater

Flow Measurements

Outfall 001

Influent to the ASB is measured at a V-notch weir and reported as plant flow. Head is measured with an ultrasonic doppler meter. The PTPC meter reported flows of 14.6 MGD during the composite sampling period. A Parshall flume at the discharge from the ASB is operational, but floods at times. Because neither flow measuring device was readily accessible to Ecology, flow measurements were not verified.

STP

STP effluent flow is measured at a V-notch weir. PTPC reported flows of 0.00698 MGD during the composite sampling period. Because of wide fluctuations in discharge and the distance to the location of the meter output, flow was not verified by Ecology.

Plant maintenance records should be reviewed to assure the flow meters are routinely calibrated.

Quality Assurance/Quality Control (QA/QC)

A discussion of QA/QC, including laboratory QA/QC and laboratory audit of the permittee appears in Appendix E.

NPDES Permit Limits Comparison/General Chemistry

Outfall 001

General chemistry data are shown in Table 2. **Discharges through Outfall 001 met all permit requirements during the inspection** (Table 3). General chemistry data showed a 5-day biochemical oxygen demand (BOD₅) removal of 95%. Total suspended solids (TSS) was removed by 97%. BOD₅ loading was half of the permitted loading. TSS loading was less than one third of the permitted loading.

The samples collected during the inspection indicated that the primary clarifier removed 81 % of the influent TSS and 9 % of the influent BOD₅.

STP

The STP was performing well during the inspection. The conventional parameters of BOD₅, TSS, and fecal coliform indicate a high quality effluent (Table 3). **The STP effluent met NPDES permit limits for BOD₅, TSS, total chlorine residual, and fecal coliform.**

The STP was removing 95 % of BOD₅ and 96 % of TSS at the time of the inspection (Table 2). Effluent BOD₅ was 12 mg/L compared with the permitted monthly average of 30 mg/L. Effluent TSS was 6 mg/L compared with the permitted monthly average of 30 mg/L.

The chlorine concentration in the STP effluent was high (2.5 mg/L; 3.0 mg/L) and the fecal coliform count was low (<3/100mL). A chlorine residual of less than or equal to 1.0 mg/L should be targeted if adequate disinfection can still be attained.

A comparison of influent and effluent ammonia and nitrate-nitrite concentrations indicate the STP was achieving substantial nitrification at the time of the inspection. Ammonia concentrations of approximately 38 mg/L in the influent were reduced to approximately 2 mg/L in the effluent, while NO₂ + NO₃-N concentrations increased from approximately 0.7 mg/L in the influent to approximately 14 mg/L in the effluent.

Split Sample Results

Comparisons between Ecology and PTPC samples and between Ecology and PTPC analyses showed close agreement (Table 4). This is an indicator of consistency between PTPC and Ecology collection methods and laboratory procedures.

Priority Pollutant Scans

Priority pollutant scans were performed on process water influent and effluent.

Fifteen VOA compounds were detected in the influent samples (Table 5). Other than acetone (1,380 µg/L est.), a solvent commonly used for cleaning laboratory and sampling equipment, the VOA compound found in the highest concentration in the influent was 2-Butanone(MEK -

556 $\mu\text{g/L}$ est.). All other VOA compounds in the influent were found in concentrations of 40 $\mu\text{g/L}$ or lower.

Chloroform (0.068 $\mu\text{g/L}$ est.), carbon disulfide (1.2 $\mu\text{g/L}$), 2-butanone (MEK) (1.1 $\mu\text{g/L}$ est.), toluene (0.16 $\mu\text{g/L}$ est.), and methylene chloride (0.56 $\mu\text{g/L}$ est.), were the VOA compounds found in the effluent.

All VOA compounds in the effluent for which there are EPA marine water quality criteria were found well below the criteria (Table 5).

Four BNA compounds were found in the influent. The compound found in the highest concentration was benzyl alcohol (44.0 $\mu\text{g/L}$).

Of the four BNA compounds found in the effluent, phenol (3.3 $\mu\text{g/L}$) was found in the highest concentration. **All BNA compounds in the effluent for which there were EPA marine water quality criteria were found in concentrations below the criteria.**

No pesticide/PCB compounds were found in the influent or effluent.

Nine metals were detected in the influent (Table 5). Zinc (70.3 $\mu\text{g/L}$) and nickel (26 $\mu\text{g/L}$ est.) were found in the highest concentrations.

Five metals were detected in the effluent. **Copper was found in an estimated concentration of over four times Ecology acute marine water criteria.** Arsenic, beryllium, cadmium, chromium, lead, and zinc were found in concentrations below acute and chronic State Water Quality Criteria. Lead was found in estimated concentrations 38% of Ecology chronic marine water criteria. Mercury and nickel were found in concentrations below acute criteria but with detection limits above chronic criteria.

A complete list of parameters analyzed and analytical results is included in Appendix F.

A number of tentatively identified compounds (TICs) were found in the influent samples in concentrations up to 3,790 $\mu\text{g/L}$ (est.). TICs were found in the effluent samples at concentrations up to 26.0 $\mu\text{g/L}$ (est.). TICs are summarized in Appendix H.

Bioassays

Two of the four organisms tested showed no toxicity to the outfall 001 effluent (Table 6). *Daphnia magna* and rainbow trout survival tests revealed no acute toxicity.

Bivalve (*Mytilus edulis*) larvae showed significant mortality with an LC_{50} of 70% effluent (estimated) and an NOEC of 8.5% effluent. **Considerable abnormality was evident for the bivalve larvae with an NOEC of 4.38% effluent.** NOEC's for bivalve larvae exposed to pulp mill effluent range from 1% to 20% and are typically 3% effluent (McCall, 1993).

The fathead minnow chronic test showed reduced growth (NOEC = 25 % effluent) and survival (NOEC = 50 % effluent).

Sediment

General Chemistry/Physical Characteristics

The two sediment samples collected near the diffuser (Sed-1 and Sed-2) consisted primarily of silt. The background sediment sample was primarily sand (Table 2), as are the sediments in the portion of Glen Cove near the outfall (NOAA, 1984). It appears that the solids deposited from the outfall has created a more silty environment. The TOC concentrations and percent volatile solids were several times higher for the stations near the outfall.

Priority Pollutant Scans

No VOA or Pesticide/PCB compounds were detected in the sediment samples (Table 7).

Up to seven BNA compounds were detected in the two samples near the diffuser, at concentrations from 54 $\mu\text{g/Kg}$ to 230 $\mu\text{g/Kg}$. **All of the BNA's detected were in concentrations below Marine Sediment Quality Standards (Ecology, 1991).**

No BNA compounds were detected in the background sediment sample (Sed-3). The lack of priority pollutant compounds in Sed-3 may be a result, at least in part, to a lack of organic materials to adhere or adsorb to in the sandy sediment.

Nine priority pollutant metals were detected in sediment samples Sed-1 and Sed-2. Seven priority pollutant metals were detected in the background sample. Metals concentrations in the background sediment sample averaged approximately half the concentrations of the samples taken from near the diffuser. **All priority pollutant metals found in the sediment samples were in concentrations well below Marine Quality Standards (Ecology, 1991)**

A complete list of parameters analyzed and analytical results is included in Appendix G.

A number of tentatively identified compounds (TICs) were found in the sediment samples in concentrations up to 2000 $\mu\text{g/Kg}$ (est.). The list of VOA and BNA TICs is similar for all three sediment sampling locations. The VOA TICs for Sed-2 were found in higher estimated concentrations than for Sed-1 and Sed-3. The BNA TICs for Sed-1 were found in higher estimated concentrations than for Sed-2 and Sed-3. TICs for the sediment samples are summarized in Appendix H.

Bioassays

No toxicity was found by the Microtox test in any of the three sediment samples (Table 8). The amphipod test showed significant toxicity in Sed-1 and Sed-2, the samples collected near the outfall. **Although toxicity was significant, absolute toxicity did not exceed 25%, so**

the sediments would not be designated as having an adverse effect (Ecology, 1991). It is unclear whether more toxicity in amphipod tests in sediments 1 and 2 than in sediment 3 is due to differences in grain size composition or other causes.

References

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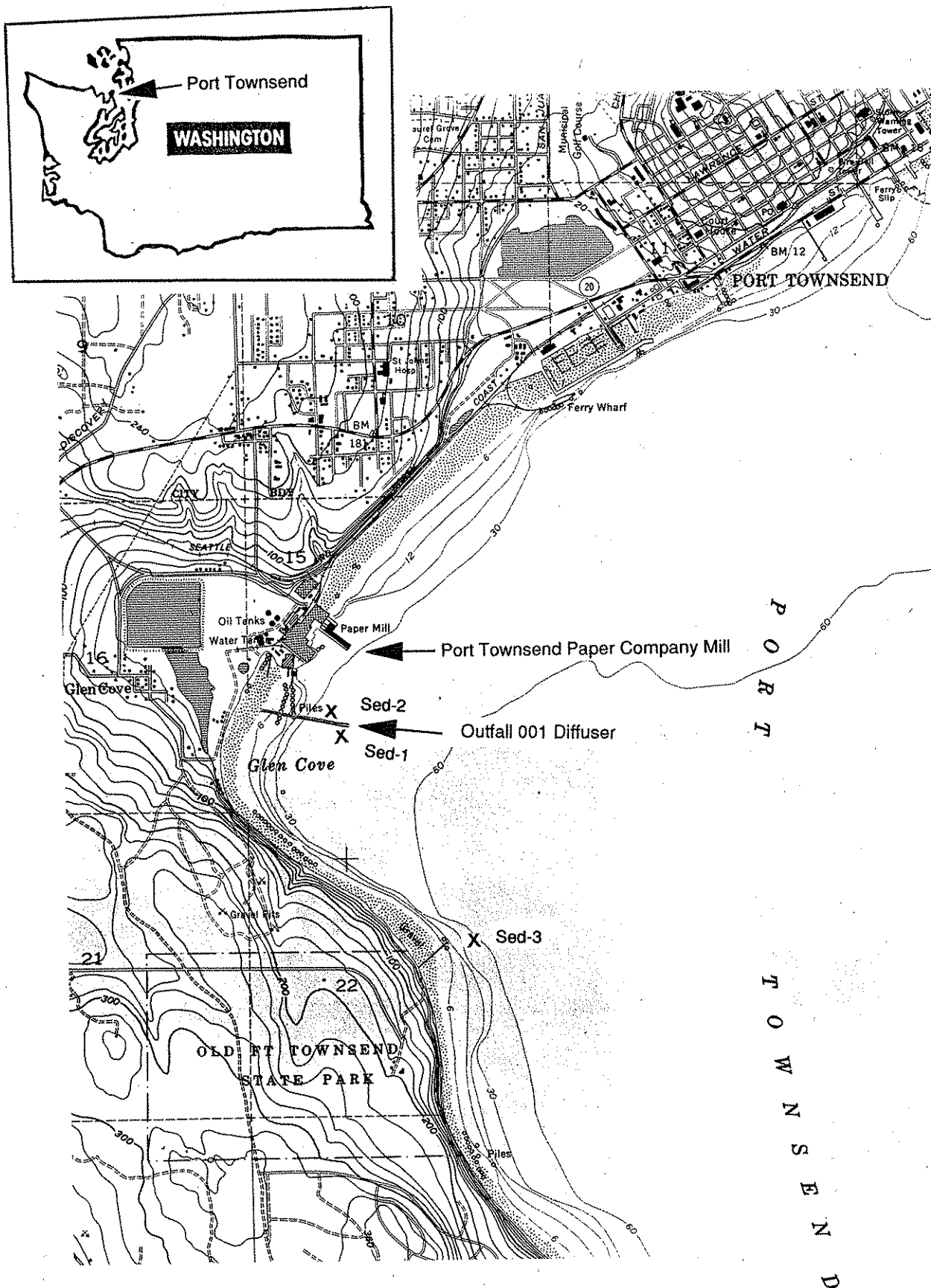


Figure 1 – Location Map – Port Townsend Paper, November/December 1993.

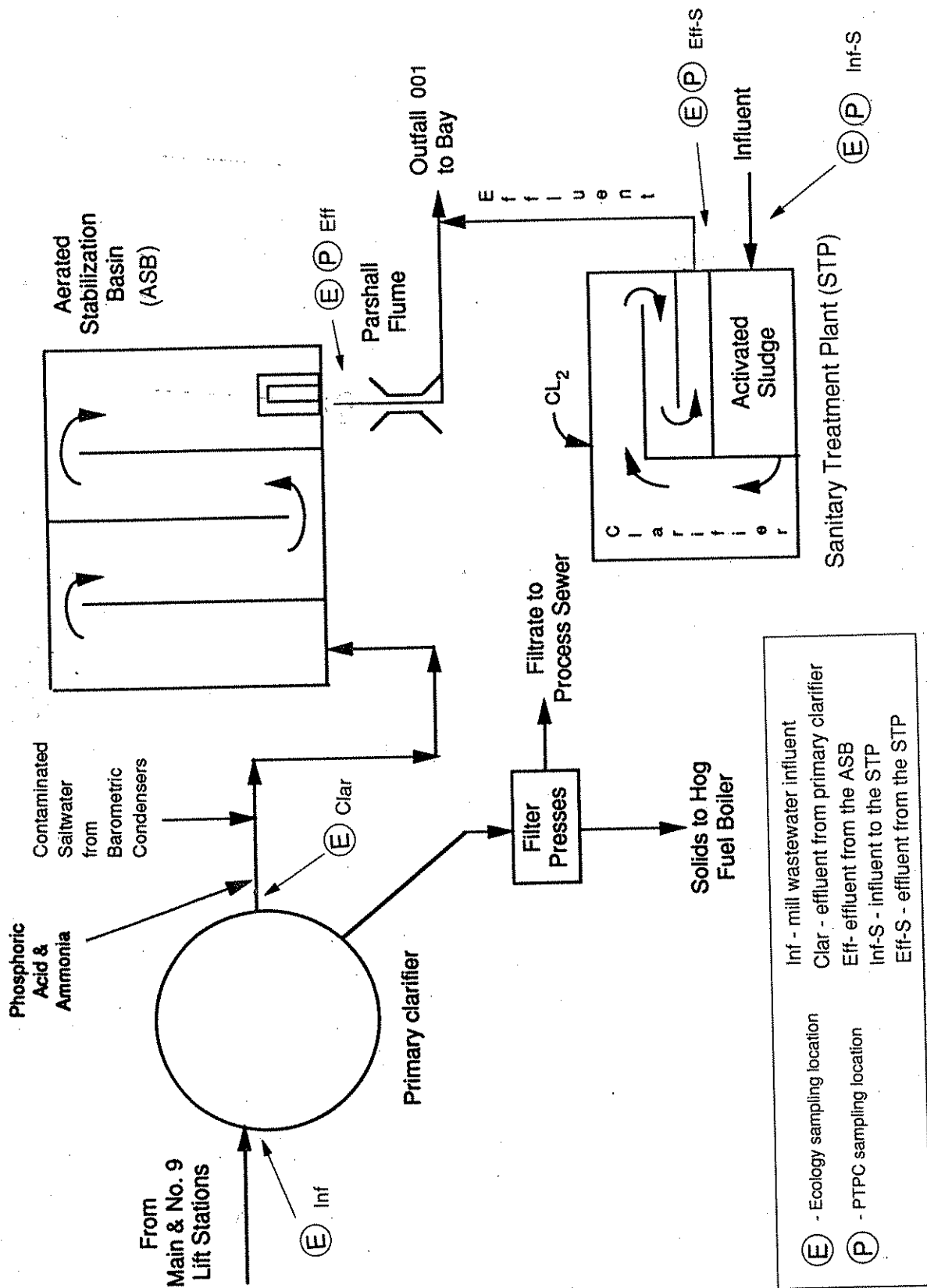


Figure 2
SCHEMATIC OF PROCESS & SANITARY WASTEWATER TREATMENT SYSTEMS
 Port Townsend Paper Corporation
 Port Townsend, Washington

Table 1 - Sampling Station Descriptions - Port Townsend Paper, 1993.

Ecology influent sample (Inf)

The grab sample was taken from the walkway at the center of the primary clarifier. The composite sampler intake was lowered through a two inch hole in the steel plate at the end of the bridge in the center of the clarifier. The intake was placed approximately 3 feet below the surface.

Ecology clarifier effluent sample (Clar)

The sampler intake was placed on the outside of the baffle at the clarifier outlet, adjacent to the PTPC sample collection shack. The sampler intake was placed approximately four feet below the surface.

Ecology 001 effluent sample (Eff)

The sampler intake was placed 8 feet upstream of the Parshall flume in the center of the channel. The intake was placed approximately 1 1/2 feet below the surface.

PTPC 001 effluent sample (Eff)

The sampler intake was placed 10 feet upstream of the Parshall flume to one side. The intake was placed approximately 1 1/2 feet below the surface.

Ecology and PTPC STP influent samples (Inf-S)

Samples were taken from the grit chamber in front of the inlet pipe upstream of the bar screen. The inlets were placed above low water level.

Ecology and PTPC STP effluent samples (Eff-S)

Samples were taken from the upstream side of the overflow weir. The Ecology sampling intake was placed 3 inches from the bottom of the outlet box, just below low water level. The PTPC sampling intake was placed 6 inches from the bottom of the box.

Sed-1

Sediment sample collected 70 feet along the diffuser from the downstream end, 50 feet out (south) in the direction away from the mill at a depth of 53 feet.

Sed-2

Sediment sample collected 70 feet along the diffuser from the upstream end, 50 feet out (north) in the direction toward the mill at a depth of 46 feet.

Sed-3

Background station. Sediment sample collected 1/2 mile south of the diffuser, adjacent to pilings at the point, off Old Fort Townsend State Park at a depth of 44 feet.

Table 2 - Ecology General Chemistry Results - Port Townsend Paper, 1993.

Parameter	Location:	Inf-1	Inf-2	Inf-E	Clar-1	Clar-2	Clar-E	Eff-1	Eff-2	Eff-GC	Eff-E	Eff-P	Eff-3
	Type:	grab	grab	comp	grab	grab	comp	grab	grab	grab-comp	comp	comp	grab
	Date:	11/16	11/16	11/16-17	11/16	11/16	11/16-17	11/16	11/16	11/16-17	11/16-17	11/16-17	11/17
	Time:	1010	1525	0800-0800	0945	1500	0800-0800	1150	1600	*	0800-0800	0800-0800	0930
	Lab Log #:	478280	478281	478282	478284	478285	478286	478287	478288	478289	478290	478291	478292
GENERAL CHEMISTRY													
Conductivity (umhos/cm)		1150	969	951	1117	1102	1002	5720	5780	5780	5790	5820	
Alkalinity (mg/L CaCO ₃)				247			238	189	190	189	190		
Hardness (mg/L CaCO ₃)							125	529	536	506	536		
Grain Size (%)													
Gravel: (4-10 Sieve Size)													
Sand: (20-230 Sieve Size)													
Silt: (4-8 Phi Size)													
Clay: (9-10 Phi Size)													
TS (mg/L)				1220			943				3460	3490	
TNVS (mg/L)				695			572				3190	3180	
TSS (mg/L)		619	631	459	135	54	86	10	12	12	15	15	
TNVSS (mg/L)				164			39				3	4	
% Solids													
% Volatile Solids													
BOD ₅ (mg/L)				247			224				13	13	
COD (mg/L)				990			770				160	180	
TOC (water mg/L)		177	209	176	208	192	73.1	37.6	36.6		37.4	37.6	
TOC (soil/seed % dry wt)													
NH ₃ -N (mg/L)				373			5.73				2.13	1.80	
NO ₂ +NO ₃ -N (mg/L)				0.095			0.083				0.119	0.404	
Total-P (mg/L)				1.43			0.628				0.359	0.366	
Oil and Grease (mg/L)		5	5		8	8		<1					3
F-Coliform MPN (#/100mL)													<20
Cyanide (wk & dis mg/L)													
AOX (ug/L)													
FIELD OBSERVATIONS													
Temperature (C)		28.4	33.4	4.1	30.8	34.8	3.5	19.0	17.5		854	973	
Temp-cooled (C)													
pH		11.4	10.9	11.1	11.2	11.0	11.5	7.5	7.5		2.9	6.3	
Conductivity (umhos/cm)		1222	1009	1009	1194	1172	1073	5910			7.5	7.6	
Chlorine (mg/L)											6260	6130	
Total													
Free													

* - grab-composite sample taken as three grabs
1150 and 1600 on 11/16 and 0830 on 11/17

Inf - mill influent
Clar - primary clarifier effluent
Eff - outfall 001 effluent from ASB
Inf-S - STP influent
Eff-S - STP effluent
grab - grab sample
comp - composite sample
E - Ecology sample
P - PTPC sample
GC - grab-composite sample

Table 2 - (cont'd) - Port Townsend Paper, 1993.

Parameter	Location:	Eff-4	Inf-S1	Inf-S2	Inf-SE	Inf-SP	Eff-S1	Eff-S2
Type:		grab	grab	grab	comp	comp	grab	grab
Date:		11/17	11/16	11/16	11/16-17	11/16/17	11/16	11/16
Time:		1245	0900	1400	0800-0800	0800-0800	0845	1415
Lab Log #:		478293	478294	478295	478296	478328	478298	478299
GENERAL CHEMISTRY								
Conductivity (umhos/cm)					678			
Alkalinity (mg/L CaCO ₃)					233			
Hardness (mg/L CaCO ₃)								
Grain Size (%)								
Gravel: (4-10 Sieve Size)								
Sand: (20-230 Sieve Size)								
Silt: (4-3 Phi Size)								
Clay: (9-10 Phi Size)								
TS (mg/L)			380	400	447	523	235	340
TNVS (mg/L)			153	177	185	192	139	168
TSS (mg/L)			117	169	161	180	9	11
TNVSS (mg/L)			4	21	13	23	4	2
% Solids								
% Volatile Solids								
BOD ₅ (mg/L)			128	196	223	170	4	4
COD (mg/L)			51.8	85.1	72.7		10.3	10.6
TOC (water mg/L)								
TOC (soil/seed % dry wt)								
NH ₃ -N (mg/L)			28.8	30.6	38.2		1.13	1.69
NO ₂ +NO ₃ -N (mg/L)			0.918	0.552	0.678		15.7	14.9
Total-P (mg/L)			5.82	6.03	6.23		4.08	4.30
Oil and Grease (mg/L)								
F-Coliform MF (#/100mL)		<3						
F-Coliform MPN (#/100mL)		<20						
Cyanide (wk & dis mg/L)								
AOX (ug/L)								
FIELD OBSERVATIONS								
Temperature (C)		18.3	15.9	14.9			10.3	10.7
Temp-cooled (C)					0.8			
pH		7.3	7.4	7.9	8.3		6.3	6.4
Conductivity (umhos/cm)		6290	541	605	721		347	358
Chlorine (mg/L)								
Total								
Free								
Inf - mill influent Clar - primary clarifier effluent Eff - outfall 001 effluent from Inf-S - STP influent Eff-S - STP effluent grab - grab sample comp - composite sample E - Ecology sample P - PTPC sample								

Table 2 - (cont'd) - Port Townsend Paper, 1993.

Parameter	Location:	Eff-SE	Eff-SP	Eff-S3	Eff-S4	Sed-1	Sed-2	Sed-3
Type:		comp	comp	grab	grab	grab	grab	grab
Date:	11/16-17	11/16-17	11/16-17	11/17	11/17	11/30	11/30	11/30
Time:	0800-0800	0800-0800	0800-0800	1230	1225	1400	1400	1510
Lab Log #:	478300	478329	478302	478303	478325	478326	478327	
GENERAL CHEMISTRY								
Conductivity (umhos/cm)		333						
Alkalinity (mg/L CaCO ₃)		27.1						
Hardness (mg/L CaCO ₃)								
Grain Size (%)								
Gravel: (4-10 Sieve Size)						0	0	0
Sand: (20-230 Sieve Size)						19	26	79
Silt: (4-3 Phi Size)						57	55	15
Clay: (9-10 Phi Size)						24	19	6
TS (mg/L)		249	234					
TNVS (mg/L)		125	136					
TSS (mg/L)		6	20					
TNVS (mg/L)		3	5					
% Solids						33	33	62
% Volatile Solids						12	11	2
BOD ₅ (mg/L)		12	<28					
COD (mg/L)		51						
TOC (water mg/L)		11.6				3.85	3.28J	1.32J
TOC (soil/seed % dry wt)								
NH ₃ -N (mg/L)		1.92						
NO ₂ -NO ₃ -N (mg/L)		14.1						
Total-P (mg/L)		3.95						
Oil and Grease (mg/L)								
F-Coliform MPN (#/100mL)								
Gyanide (wk & dis mg/L)								
AOX (ug/L)								
FIELD OBSERVATIONS								
Temperature (C)				9.9	10.7			
Temp-cooled (C)								
pH		1.2		6.5	7.0			
Conductivity (umhos/cm)		6.6		347	375			
Chlorine (mg/L)		352						
Total				2.5	3.0			
Free				2.0	0.8			

GC - grab-composite sample
 E - Ecology sample
 P - PTPC sample
 S - sanitary sewage treatment plant
 Sed - sediment sample.

Inf - plant influent
 Eff - plant effluent
 grab - grab sample
 comp - composite sample
 Clar - effluent from clarifier

Table 3 – NPDES Permit Limits and Inspection Results – Port Townsend Paper, 1993.

Outfall 001

Parameter	NPDES Limits		Ecology Inspection Results
	Monthly Avg.	Daily Max.	
BOD5 (lbs/day)	3,100*	6,000*	1,583
TSS (lbs/day)	6,400*	12,600*	1,826
pH	6.0 to 9.0		7.5; 7.5
Flow (MGD)	--	--	14.6 MGD
Production (ADT/day**)	--	--	727.1

* permit limits are higher for certain thresholds of monthly production exceeding 600 tons/day.

** Tons/day at 10% moisture for 11/16/93 as reported by Port Townsend Paper.

Sanitary Treatment Plant (prior to junction with 001)

Parameter	NPDES Limits		Ecology Inspection Results
	Monthly Avg.	Weekly Avg.	
BOD5 (mg/L)	30	45	12
TSS (mg/L)	30	45	6
Fecal Coliform (#/100mL)	200	400	<3
Total Residual Chlorine (mg/L)	0.1 to 5.0		2.5 – 3.0
pH	--	--	6.3 – 7.0
Flow (MGD)	--	--	0.00698

Table 4 – Split Sample Results Comparison – Port Townsend Paper, 1993.

Location:	Inf-E	Clar-E	Eff-E	Eff-P	Inf-SE	Inf-SP	Eff-SE	Eff-SP
Type:	comp	comp	comp	comp	comp	comp	comp	comp
Date:	11/16-17	11/16-17	11/16-17	11/16-17	11/16-17	11/16-17	11/16-17	11/16-17
Time:	0800-0800	0800-0800	0800-0800	0800-0800	0800-0800	0800-0800	0800-0800	0800-0800
Lab Log #:	478282	478286	478290	478291	478296	478328	478300	478329
Sampled by:	Ecology	Ecology	Ecology	PTPC	Ecology	PTPC	Ecology	PTPC
Parameter: Analysis by:								
BOD ₅ (mg/L)	Ecology	247	224	13	13	223	170	12
	PTPC	317	253	11	12	176	199	18
TSS (mg/L)	Ecology	459	86	15	15	161	180	12
	PTPC	424	66	10	10	170	177	10

PTPC – Port Townsend Paper Corporation

Inf – influent
Eff – effluent
S – sanitary wastewater plant

E – Ecology sample
P – Port Townsend Paper sample
grab – grab sample
comp – composite sample

Table 5 - (cont'd) - Port Townsend Paper, 1993.

Location:				Ecology Water Quality Criteria Summary			
Type:							
Date:							
Time:							
Lab Log#:							
Hardness = 530							
Metals**							
Arsenic	3.3 P	2.4 P	11 P	69	38		
Beryllium	1.1 P	1 U	2.2 P				
Cadmium	0.42 P	0.12 P	0.05 U	37	8.0		
Chromium	9.3 P	5 U	10 U				
Hexavalent				1,100	50		
Trivalent				10,300			
Copper	19 P	11 P	2.5				
Lead	9.3 P	2.2 P	151				
Mercury (total)	0.053 P	0.05 U	2.1				
Nickel	26 P	10 U	71				
Zinc	70.3	16 P	85				

** total recoverable unless otherwise specified

NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

* Insufficient data to develop criteria. Value presented is the LOEL - Lowest Observed Effect Level.

** pH dependent criteria (7.8 pH used).

a Total Halomethanes

i Total Phthalate Esters

n Total Polynuclear Aromatic Hydrocarbons

U - The analyte was not detected at or above the reported result.

J - The analyte was positively identified. The associated numerical result is an estimate.

UJ - The analyte was not detected at or above the reported estimated result.

P - The analyte was detected above the instrument detection limit but below the established quantitation limit.

□ - acute or chronic criteria exceeded

Table 6 – Effluent Bioassay Results – Port Townsend Paper, 1993.

All tests were on Sample No. 478289 (Eff-GC)

Daphnia magna – 48-hour survival test
(*Daphnia magna*)

Sample Concentration	# Tested*	Percent Survival
0 % effluent	20	95
6.25 % effluent	20	95
12.5 % effluent	20	90
25 % effluent	20	100
50 % effluent	20	100
100 % effluent	20	90

* 4 replicates of 5 organisms

LC50 = >100 % effluent
NOEC = 100 % effluent
LOEC = >100 % effluent

Bivalve Larvae – 48 hour survival and development test
(*Mytilus edulis*)

Sample Conc.*	% Abnormal or Dead		% Mortality		
	Actual	Adjusted**	Actual	Adjusted**	
70 % Effluent	100.0	100.0	48.5	32.3	++
35 % Effluent	100.0	100.0	57.4	44.0	++
17.5 % Effluent	98.2	98.1	57.1	43.6	++
8.75 % Effluent	14.2	9.8	17.0	0.0	
4.38 % Effluent	4.3	0.0	17.3	0.0	
Control	4.6	1.0	19.3	0.0	

Abnormality
NOEC = 4.38 % effluent
LOEC = 8.75 % effluent
EC50 = 12 % effluent

Survival
LC50 = 70 % ***
NOEC = 8.75 % effluent
LOEC = 17.5 % effluent

* 4 replicates per test concentration, average initial count of 254 embryos per replicate. Salinity adjusted with seawater from Possession Point to a salinity of 30 ppt.

** corrected for control response using Abbott's formula.

*** The LC50 is not well determined because of the flatness of the dose response curve.

++ statistically significant mortality

Table 6 – (cont'd) – Port Townsend Paper, 1993.

Fathead Minnow – 7 day survival and growth test
(*Pimephales promelas*)

Sample Conc.	# Tested *	Percent Survival	Average Dry Weight per Fish (mg)
100 % Effluent	40	87.5	0.40
50 % Effluent	40	90.0	0.43
25 % Effluent	40	97.5	0.48
12.5 % Effluent	40	100.0	0.54
6.25 % Effluent	40	100.0	0.53
Control	40	97.5	0.57

Survival

NOEC = 50 % effluent
LOEC = 100 % effluent
LC50 = >100 % effluent

Growth

NOEC = 25 % effluent
LOEC = 50 % effluent

* four replicates of 10 organisms

Rainbow Trout – 96 hour survival test
(*Oncorhynchus mykiss*)

Sample	# Tested	Percent Survival
Control	30	93
65 % Effluent	30	90

NOEC - no observable effects concentration
LOEC - lowest observable effects concentration
LC50 - lethal concentration for 50% of the organisms
EC50 - effect concentration for 50% of the organisms

Table 7 - Sediment VOA, BNA and PCB/Pesticide Compounds and Metals Detected - Port Townsend Paper, 1993.

Marine Sediment Quality Standards

Chemical Criteria

Organics Data Normalized to TOC

Location:	Dry Weight Basis			Organics Data Normalized to TOC			Marine Sediment Quality Standards	
	Sed-1	Sed-2	Sed-3	Sed-1	Sed-2	Sed-3	Dry Wt. Basis	TOC Basis
	grab	grab	grab	grab	grab	grab		
	12/15	12/15	12/15	12/15	12/15	12/15		
Type:								
Date:								
Time:								
Lab Log #:	498325	498326	498327	498325	498326	498327		
VOA Compounds	ug/Kg	ug/Kg	ug/Kg	mg/Kg	mg/Kg	mg/Kg		mg/Kg

(none detected)

BNA Compounds

Phenanthrene	730 U	56 J	710 U	19.0 U	1.7 J	53.8 U	100
Fluoranthene	180 J	90 J	710 U	4.7 J	2.7 J	53.8 U	160
Pyrene	170 J	100 J	710 U	4.4 J	3.0 J	53.8 U	1000
Benzo(a)Anthracene	110 J	72 J	710 U	2.9 J	2.2 J	53.8 U	110
Chrysene	200 J	140 J	710 U	5.2 J	4.3 J	53.8 U	110
Benzo(b)Fluoranthene	230 J	90 J	710 U	6.0 J	2.7 J	53.8 U	
Benzo(a)Pyrene	730 U	54 J	710 U	19.0 U	1.6 J	53.8 U	99

Pesticide/PCB Compounds

(none detected)

Location:	Dry Weight Basis			Dry Wt. Basis
	Sed-1	Sed-2	Sed-3	
	grab	grab	grab	
	12/15	12/15	12/15	
Type:				
Date:				
Time:				
Lab Log#:	498325	498326	498327	
	mg/Kg	mg/Kg	mg/Kg	mg/Kg

Metals

Arsenic	7.97	8.05	3.15	57
Cadmium	0.528	0.558	0.301	5.1
Chromium	39	39.4	21.1	260
Copper	44.3	38	11.3	390
Lead	17.6 J	18.4 J	4.41 J	450
Mercury	0.047 J	0.044 J	0.048 J	0.41
Nickel	33.8	33.6	27.1	
Selenium	0.92 P	0.82 P	0.40 U	
Silver	0.16 P	0.16 P	0.10 U	
Zinc	86.8	80.9	31.8	6.1

Sed-1 - near the downstream end of the diffuser at a depth of 53 feet

Sed-2 - near the upstream end of the diffuser at a depth of 46 feet

Sed-3 - background station 1/2 mile south of the diffuser off of Old Fort Townsend State Park

- acute or chronic criteria exceeded

U - The analyte was not detected at or above the reported result.

J - The analyte was positively identified. The associated numerical result is an estimate.

P - The analyte was detected above the instrument detection limit but below the established quantitation limit.

Table 8 – Sediment Bioassay Results – Port Townsend Paper, 1993.

Marine Amphipod Sediment Test
(*Rhepoxinius abronius*)

Sample	Sample No.	No. Tested*	% Survival
Control	Control	100	98
Sed-1	498325	100	75 **
Sed-2	498326	100	83 **
Sed-3	498327	100	94

* 5 replicates of 20 organisms each per treatment.

Microtox Sediment Toxicity Test
EC50 (% extract)

Sample	Sample No.	15 minutes	30 minutes
Sed-1	498325	a	a
Sed-2	498326	a	a
Sed-3	498327	a	a

a Statistical analysis resulted in a large number of negative gammas. Negative gammas are interpreted as a lack of toxicity.

** statistically significant mortality

Sed-1 - near the downstream end of the diffuser at a depth of 53 feet.

Sed-2 - near the upstream end of the diffuser at a depth of 46 feet

Sed-3 - background station 1/2 mile south of the diffuser at Old Fort Townsend State Park.

APPENDICES

Appendix A - Sampling Procedures - Port Townsend Paper, 1993.

Mill process water was sampled with conventional timer operated composite samplers. Because flow to the STP is intermittent, the Ecology STP influent sampler was actuated by a float switch so that one sample would be taken for each high flow between 8 AM and 8 AM. The Ecology STP effluent sampler was set up to collect flow proportioned samples, including periods when effluent flow was low.

Other than for the STP influent, all Ecology Isco samplers were set up to collect equal volumes of sample every 30 minutes for 24 hours. All samplers were set to collect sample from 8 AM to 8 AM to coincide with plant sampler collection times. All composite samplers were iced to keep samples cool. Sampler configurations and locations are summarized in Figure 2 and Table 1.

The PTPC final effluent sampler was set up to collect equal volumes of sample every 30 minutes from 8AM to 8AM. The PTPC STP influent and effluent samplers collected samples from 8 AM to 8 AM on a time proportional basis. The samples collected sample only when water was present at the sample intake levels, corresponding to periods when wastewater influent was being pumped to the plant.

Ecology employed a 0.1 m² van Veen grab sampler to collect sediments at three stations: one at a background site approximately 1/2 mile south of the diffuser off of the point at Old Fort Townsend State Park at 44' depth (Sed-3); one at the downstream end of the diffuser 70' along the diffuser from the end, 50' toward the mill at 53' depth (Sed-1); and one at the upstream end of the diffuser 70' along the diffuser from the end, 50' away from the diffuser in the direction of the mill at 46' depth (Sed-2). Sediment sample locations are shown in Figure 1.

At each sediment station, the top two centimeters of sample from successive grab samples were collected. A VOA bottle was filled from one grab, while the remainder of the sample was placed in a three gallon stainless steel bucket, homogenized and put in appropriate containers for analysis.

Appendix B - Sampling Schedule - Port Townsend Paper, 1993.

Parameter	Location:	Inf-1	Inf-2	Inf-E	Clar-1	Clar-2	Clar-E	Eff-1	Eff-2	Eff-GC	Eff-E	Eff-P	Eff-3
Type:		grab	grab	comp	grab	grab	comp	grab	grab	grab-comp	comp	comp	grab
Date:		11/16	11/16	11/16-17	11/16	11/16	11/16-17	11/16	11/16	11/16-17	11/16-17	11/16-17	11/17
Time:		1010	1525	0800-0800	0945	1500	0800-0800	1150	1600	0800-0800	0800-0800	0800-0800	0930
Lab Log #:		478280	478281	478282	478284	478285	478286	478287	478288	478289	478290	478291	478292
GENERAL CHEMISTRY													
Conductivity (umhos/cm)		E	E	E	E	E	E	E	E	E	E	E	E
Alkalinity (mg/L CaCO3)				E			E	E	E	E	E	E	E
Hardness (mg/L CaCO3)							E	E	E	E	E	E	E
Grain Size (%)													
TS (mg/L)				E			E	E	E	E	E	E	E
TNVS (mg/L)				E			E	E	E	E	E	E	E
TSS (mg/L)				EP			EP	E	E	E	EP	EP	EP
TNVSS (mg/L)				E			E	E	E	E	E	E	E
% Solids													
% Volatile Solids													
BOD5 (mg/L)				EP			EP				EP	EP	EP
COD (mg/L)				E			E	E	E	E	E	E	E
TOC (water mg/L)				E			E	E	E	E	E	E	E
TOC (soil/seed %)													
NH3-N (mg/L)				E			E	E	E	E	E	E	E
NO2+NO3-N (mg/L)				E			E	E	E	E	E	E	E
Total-P (mg/L)				E			E	E	E	E	E	E	E
Oil and Grease (mg/L)													
F-Coliform MF (#/100mL)													
F-Coliform MPN (#/100mL)													
Cyanide (wk & dis ug/L)													
ORGANICS													
AOX (ug/L)				E			E	E	E	E	E	E	E
VOC (water)													
VOG (soil/seed)													
BNAs (water)				E			E				E		
BNAs (soil/seed)													
Pest/PCB (water)				E			E				E		
Pest/PCB (soil/seed)													
METALS													
PP Metals (water)				E			E				E		
PP Metals (soil/seed)													
BIOASSAYS													
Salmonid (acute 65%)										E	E	E	E
Fathead minnow (chronic)										E	E	E	E
Daphnia magna (acute)										E	E	E	E
Bivalve larvae (chronic)										E	E	E	E
Rhepoxinus (solid acute)										E	E	E	E
Microtox (solid acute)										E	E	E	E
FIELD OBSERVATIONS													
Temperature (C)				E			E	E	E	E	E	E	E
Temp-cooled (C)				E			E	E	E	E	E	E	E
pH				E			E	E	E	E	E	E	E
Conductivity (umhos/cm)				E			E	E	E	E	E	E	E
Chlorine (mg/L)													
Total													
Free													

* -- grab-composite sample taken as three grabs
1150 and 1600 on 11/16 and 0830 on 11/17

Inf - mill influent
Clar - primary clarifier effluent
Eff - outfall 001 effluent from ASB
Inf-S - STP influent
Eff-S - STP effluent
grab - grab sample
comp - composite sample
E - Ecology sample or analysis
P - PTPC sample or analysis
GC - grab-composite sample

Appendix B - (cont'd) - Port Townsend Paper, 1993.

Parameter	Location:	Eff-4	Inf-S1	Inf-S2	Inf-SE	Inf-SP	Eff-S1	Eff-S2
	Type:	grab	grab	grab	comp	comp	grab	grab
	Date:	11/17	11/16	11/16	11/16-17	11/16/17	11/16	11/16
	Time:	1245	0900	1400	0800-0800	0800-0800	0845	1415
	Lab Log #:	478293	478294	478295	478296	478328	478298	478299
GENERAL CHEMISTRY								
Conductivity (umhos/cm)					E			
Alkalinity (mg/L CaCO3)					E			
Hardness (mg/L CaCO3)								
Grain Size (%)								
TS (mg/L)			E	E	E	E	E	E
TNVS (mg/L)			E	E	E	E	E	E
TSS (mg/L)			E	E	EP	EP	E	E
TNVSS (mg/L)			E	E	E	E	E	E
% Solids								
% Volatile Solids								
BOD5 (mg/L)			E	E	EP	EP	E	E
COD (mg/L)								
TOC (water) (mg/L)			E	E	E		E	E
TOC (soil/seed) (%)								
NH3-N (mg/L)			E	E	E		E	E
NO2+NO3-N (mg/L)			E	E	E		E	E
Total-P (mg/L)			E	E	E		E	E
Oil and Grease (mg/L)								
F-Coliform MPN (#/100mL)		E						
F-Coliform MPN (#/100mL)		E						
Cyanide (wk & dis) (ug/L)								
ORGANICS								
AOX (ug/L)								
VOC (water)								
VOC (soil/seed)								
BNAs (water)								
BNAs (soil/seed)								
Pest/PCB (water)								
Pest/PCB (soil/seed)								
METALS								
PP Metals (water)								
PP Metals (soil/seed)								
BIOASSAYS								
Salmonid (acute 65%)								
Fathead minnow (chronic)								
Daphnia magna (acute)								
Blivale larvae (chronic)								
Rhepoxinus (solid acute)								
Microtox (solid acute)								
FIELD OBSERVATIONS								
Temperature (C)		E	E	E			E	E
Temp-cooled (C)					E		E	E
pH		E	E	E	E		E	E
Conductivity (umhos/cm)		E	E	E	E		E	E
Chlorine (mg/L)								
Total								
Free								

Appendix B - (cont'd) - Port Townsend Paper, 1993.

Parameter	Location:	Eff-SE	Eff-SP	Eff-S3	Eff-S4	Sed-1	Sed-2	Sed-3
	Type:	comp	comp	grab	grab	grab	grab	grab
	Date:	11/16-17	11/16-17	11/17	11/17	11/30	11/30	11/30
	Time:	0800-0800	0800-0800	0800	1230	1225	1400	1510
	Lab Log #:	478300	478329	478302	478303	478325	478326	478327
GENERAL CHEMISTRY								
Conductivity (umhos/cm)		E						
Alkalinity (mg/L CaCO ₃)		E						
Hardness (mg/L CaCO ₃)								
Grain Size (%)								
TS (mg/L)		E	E					
TNVS (mg/L)		E	E					
TSS (mg/L)		EP	EP			E	E	E
TNVSS (mg/L)		E				E	E	E
% Solids								
% Volatile Solids								
BOD5 (mg/L)		EP	EP					
COD (mg/L)		E						
TOC (water) (mg/L)						E	E	E
TOC (soil/seed) %								
NH ₃ -N (mg/L)		E						
NO ₂ +NO ₃ -N (mg/L)		E						
Total-P (mg/L)		E						
Oil and Grease (mg/L)				E	E			
F-Coliform MF (#/100mL)								
F-Coliform MPN (#/100mL)								
Cyanide (wk & dis) (ug/L)								
ORGANICS								
AOX (ug/L)								
VOC (water)						E	E	E
VOC (soil/seed)								
BNAs (water)						E	E	E
BNAs (soil/seed)								
Pest/PCB (water)						E	E	E
Pest/PCB (soil/seed)								
METALS								
PP Metals (water)						E	E	E
PP Metals (soil/seed)								
BIOASSAYS								
Salmonid (acute 65%)								
Fathead minnow (chronic)								
Daphnia magna (acute)						E	E	E
Briviale larvae (chronic)						E	E	E
Rhepoxinus (solid acute)								
Microtox (solid acute)								
FIELD OBSERVATIONS								
Temperature (C)				E	E			
Temp-cooled (C)		E						
pH		E		E	E			
Conductivity (umhos/cm)		E		E	E			
Chlorine (mg/L)								
Total				E	E			
Free				E	E			

GC - grab-composite sample
 E - Ecology sample or analysis
 P - PTPC sample or analysis
 S - sanitary sewage
 treatment plant

Inf - plant influent
 Eff - plant effluent
 grab - grab sample
 comp - composite sample
 Clar - effluent from clarifier

Appendix C – Ecology Analytical Methods – Port Townsend Paper, 1993.

Laboratory Analysis	Method Used for Ecology Analysis	Laboratory Performing Analysis
GENERAL CHEMISTRY		
Conductivity	EPA, Revised 1983: 120.1	Ecology Manchester Laboratory
Alkalinity	EPA, Revised 1983: 310.1	Ecology Manchester Laboratory
Hardness	EPA, Revised 1983: 130.2	Ecology Manchester Laboratory
Grain Size	Tetra Tech, 1986: TC-3991-04	Soil Technology
TS	EPA, Revised 1983: 160.3	Ecology Manchester Laboratory
TNVS	EPA, Revised 1983: 160.3	Ecology Manchester Laboratory
TSS	EPA, Revised 1983: 160.2	Ecology Manchester Laboratory
TNVSS	EPA, Revised 1983: 160.2	Ecology Manchester Laboratory
% Solids	APHA, 1992: 2540G	Ecology Manchester Laboratory
% Volatile Solids	EPA, Revised 1983: 160.4	Ecology Manchester Laboratory
BOD5	EPA, Revised 1983: 405.1	Ecology Manchester Laboratory
COD	EPA, Revised 1983: 410.1	Sound Analytical Services
TOC (water)	EPA, Revised 1983: 415.1	Ecology Manchester Laboratory
TOC (soil/sed)	EPA, Revised 1983: 415.1	Analytical Resources Inc
NH3-N	EPA, Revised 1983: 350.1	Ecology Manchester Laboratory
NO2+NO3-N	EPA, Revised 1983: 353.2	Ecology Manchester Laboratory
Total-P	EPA, Revised 1983: 365.3	Ecology Manchester Laboratory
Oil and Grease (water)	EPA, Revised 1983: 413.1	Ecology Manchester Laboratory
F-Coliform MF	APHA, 1992: 9222D	Ecology Manchester Laboratory
F-Coliform MPN	APHA, 1992: 9221E	Ecology Manchester Laboratory
Cyanide (wk & dis)	APHA, 1992: 4500-CN1	Ecology Manchester Laboratory
ORGANICS		
AOX	EPA, 1986: 9020	Sound Analytical Services
VOC (water)	EPA, 1986: 8260	Ecology Manchester Laboratory
VOC (soil/sed)	EPA, 1986: 8240	Ecology Manchester Laboratory
BNAs (water)	EPA, 1986: 8270	Ecology Manchester Laboratory
BNAs (soil/sed)	EPA, 1986: 8270	Analytical Resources Inc
Pest/PCB (water)	EPA, 1986: 8080	Ecology Manchester Laboratory
Pest/PCB (soil/sed)	EPA, 1986: 8080	Analytical Resources Inc
METALS		
PP Metals (water)	EPA, Revised 1983: 200-299	Ecology Manchester Laboratory
PP Metals (soil/sed)	EPA, Revised 1983: 200-299	Ecology Manchester Laboratory
BIOASSAYS		
Salmonid (acute 65%)	Ecology, 1981	Parametrix Inc
Fathead minnow (chronic)	EPA 1989: 1000.0	Parametrix Inc
Daphnia magna (acute)	EPA 1985	Parametrix Inc
Bivalve Larvae (chronic)	ASTM E724-1989	Parametrix Inc
Rhepoxinus (solid: acute)	ASTM 1990: E1367	Parametrix Inc
Microtox (solid acute)	Beckman, 1982	Ecology Manchester Laboratory

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Appendix D

Priority Pollutant Cleaning Procedures

Port Townsend Paper, 1993.

PRIORITY POLLUTANT SAMPLING EQUIPMENT CLEANING PROCEDURES

- 1. Wash with laboratory detergent**
- 2. Rinse several times with tap water**
- 3. Rinse with 10% HNO₃ solution**
- 4. Rinse three (3) times with distilled/deionized water**
- 5. Rinse with high purity methylene chloride**
- 6. Rinse with high purity acetone**
- 7. Allow to dry and seal with aluminum foil**

SAMPLING QA/QC

Ecology quality assurance procedures for sampling included priority pollutant cleaning the sampling equipment prior to the inspection to prevent sample contamination (Appendix D).

For sediment samples, sampling quality assurance/quality control steps included collecting only sediments not in direct contact with the sampler and pre-inspection priority pollutant cleaning of equipment that would touch the samples (Appendix D).

Chain of custody procedures were followed to assure the security of the samples (Huntamer and Hyre, 1991).

LABORATORY QA/QC

Analysis

Most Ecology laboratory data met Ecology QA/QC guidelines and are considered to be reliable. Those data that did not meet the guidelines are appropriately qualified on the data tables. Problems with specific tests are discussed in the following paragraphs.

General Chemistry Analysis

Some TOC matrix spike recoveries were not within QC limits until they were re-analyzed. For this reason, the results for two samples not analyzed in replicate or as spikes have been qualified with a J. Other general chemistry results were acceptable.

VOA Analysis - Plant Samples

Low levels of the common laboratory solvents acetone and methylene chloride were detected in the laboratory blanks. The EPA five times rule was applied to all target compounds. Surrogate recoveries and holding times were acceptable. Matrix spikes were within acceptable QC limits with the exception of 2-Hexanone.

VOA Analysis - Sediment Samples

Low levels of the common laboratory solvents acetone and methylene chloride were detected in the laboratory blanks. The EPA five times rule was applied to all target compounds. Holding times and surrogate recoveries were acceptable. The matrix spikes were within acceptable QC limits for all but sixteen compounds. The results for these compounds in the matrix source sample, 498325, were qualified with a J.

BNP Analysis - Plant Samples

Low levels of some target compounds were detected in the laboratory blanks. The EPA five times rule was applied to all target compounds. Surrogate recoveries and holding times were acceptable. Matrix spikes were not analyzed due to insufficient sample.

BNP Analysis - Sediment Samples

Holding times, method blanks, GC/MS tuning and calibration, matrix spikes, and surrogate recoveries were acceptable. 2-chloronaphthalene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene were outside of acceptable calibration limits and have been qualified with a UJ.

Pesticides/PCB Analysis - Plant Samples

Because of poor surrogate recoveries in sample 478090, all results for that sample have been qualified with a UJ. The matrix spike source sample, 478282, yielded low recoveries for aldrin, 4,4'-DDT, methoxychlor, chlordane, and lindane. These pesticides were qualified with a UJ for sample 478282.

Metals Analysis - Plant Samples

Holding times, instrument calibration, procedural blanks, precision data, and LCS analyses were all acceptable. Spike and duplicate sample analyses were acceptable with the exception of thallium which was qualified with an N.

Metals Analysis - Sediment Samples

Holding times, instrument calibration, procedural blanks, and precision data were acceptable. Spiked sample analyses were acceptable with the exceptions of antimony, lead, and mercury. Only one mercury spike was low and was qualified with a J.

LABORATORY AUDIT

The PTPC laboratory was audited by Ecology's Quality Assurance Section, and was accredited by Ecology on June 1, 1992. The accreditation was renewed on May 27, 1993.

Appendix F – VOA, BNA, Pesticide/PCB and Metals Scan Results – Port Townsend Paper, 1993.

Location:		Inf-1	Inf-2	Eff-1	Eff-2
Type:		grab	grab	grab	grab
Date:		11/16	11/16	11/16	11/16
Time:		1010	1525	1150	1600
Lab Log#:		478280	478281	478287	478288
VOA Compounds		µg/L	µg/L	µg/L	µg/L
(Group) [†]					
a	Carbon Tetrachloride	0.048 J	1.0 UJ	1.0 UJ	1.0 UJ
	Acetone	1380 J	861 J	4.3 UJ	2.4 UJ
a	Chloroform	3.9	4.1	0.068 J	1.0 U
	Benzene	2.3	1.0 U	1.0 U	1.0 U
c	1,1,1-Trichloroethane	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
a	Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U
a	Chloromethane	1.0 U	1.0 U	1.0 U	1.0 U
a	Dibromomethane	1.0 U	1.0 U	1.0 U	1.0 U
a	Bromochloromethane	1.0 U	1.0 U	1.0 U	1.0 U
	Chloroethane	1.0 U	1.0 U	1.0 U	1.0 U
	Vinyl Chloride	1.0 U	1.0 U	1.0 U	1.0 U
a	Methylene Chloride	1.0 UJ	1.0 UJ	1.0 UJ	0.56 J
	Carbon Disulfide	1.0 U	39.9	1.0 U	1.2
a	Bromoform	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
a	Bromodichloromethane	0.74 J	0.82 J	1.0 U	1.0 U
	1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
b	1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
a	Trichlorofluoromethane	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
a	Dichlorodifluoromethane	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
d	1,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U
	2-Butanone (MEK)	556 J	469 J	1.1 J	5.0 U
c	1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
	Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
f	1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U
g	1,2,3-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
	Hexachlorobutadiene	1.0 U	1.0 U	1.0 U	1.0 U
n	Naphthalene	1.0 U	1.0 U	1.0 U	1.0 U
	o-Xylene	1.0 U	1.0 U	1.0 U	1.0 U
	2-Chlorotoluene	1.0 U	1.0 U	1.0 U	1.0 U
h	1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
	1,2,4-Trimethylbenzene	0.84 J	1.0 U	1.0 U	1.0 U
	1,2-Dibromo-3-Chloropropane (DBCP)	2.0 U	2.0 U	2.0 U	2.0 U
	1,2,3-Trichloropropane	1.0 U	1.0 U	1.0 U	1.0 U
	tert-Butylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
	Isopropylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
	p-Isopropyltoluene	14.6	29.0	1.0 U	1.0 U
	Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
	Ethenyl-Benzene	0.22 J	1.0	1.0 U	1.0 U
	Propylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
	Butylbenzene	4.0	1.0 U	1.0 U	1.0 U
	4-Chlorotoluene	1.0 U	1.0 U	1.0 U	1.0 U
h	1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
	1,2-Dibromoethane (EDB)	1.0 U	1.0 U	1.0 U	1.0 U
	1,2-Dichloroethane	1.0 UJ	1.0 UJ	1.0 U	1.0 UJ
	4-Methyl-2-Pentanone (MIBK)	2.0 U	2.0 U	2.0 U	2.0 U
	1,3,5-Trimethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
	Bromobenzene	1.0 U	1.0 U	1.0 U	1.0 U
	Toluene	3.4	7.6	0.16 J	0.12 J
g	Chlorobenzene	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
g	1,2,4-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
a	Dibromochloromethane	0.096 J	0.10 J	1.0 U	1.0 U
	Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U
	sec-Butylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
d	1,3-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U
b	cis-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
b	trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
h	1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
e	1,1-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U
	2-Hexanone	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
d	2,2-Dichloropropane	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
f	1,1,1,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U
	Total Xylenes	0.20 J	0.26 J	3.0 U	3.0 U
	m,p-Xylene	0.20 J	0.26 J	2.0 U	2.0 U
e	cis-1,3-Dichloropropene	0.53 U	0.53 U	0.53 U	0.53 U
e	trans-1,3-Dichloropropene	0.47 U	0.47 U	0.47 U	0.47 U

Appendix F - (cont'd) - Port Townsend Paper, 1993.

		Location:	Inf-E	Eff-E
		Type:	comp	comp
		Date:	11/16-17	11/16-17
		Time:	0800-0800	0800-0800
		Lab Log#:	478282	478290
BNA Compounds			µg/L	µg/L
(Group) ¹				
n	Benzo(a)Pyrene		1.4 U	1.6 U
i	2,4-Dinitrophenol		14.5 U	16.5 U
n	Dibenzo(a,h)Anthracene		1.4 U	1.6 U
n	Benzo(a)Anthracene		1.4 U	1.6 U
	4-Chloro-3-Methylphenol		1.4 U	1.6 UJ
	Aniline		1.4 U	1.6 U
	Dimethyl-nitrosamine		1.4 U	1.6 U
	Benzoic Acid		7.3 U	8.2 U
	Hexachloroethane		1.4 U	1.6 UJ
	Hexachlorocyclopentadiene		14.5 U	16.5 UJ
	Isophorone		1.4 U	0.40 J
n	Acenaphthene		1.4 U	1.6 U
i	Diethyl Phthalate		1.4 U	1.6 U
i	Di-n-Butyl Phthalate		1.4 U	0.57 J
n	Phenanthrene		1.2 J	1.6 U
i	Butylbenzyl Phthalate		1.4 U	0.58 J
k	N-Nitrosodiphenylamine		1.4 U	1.6 U
n	Fluorene		1.4 U	1.6 U
	Carbazole		1.4 U	1.6 U
	Hexachlorobutadiene		1.4 U	1.6 U
	Pentachlorophenol		7.3 U	8.2 U
	2,4,6-Trichlorophenol		1.4 U	1.6 U
	2-Nitroaniline		3.6 U	4.1 U
i	2-Nitrophenol		3.6 U	4.1 U
	1-Methylnaphthalene		1.4 U	1.6 U
n	Naphthalene		16.1	1.6 U
	2-Methylnaphthalene		1.4 U	1.6 U
m	2-Chloronaphthalene		1.4 U	1.6 U
	3,3'-Dichlorobenzidine		1.8 U	2.1 U
	Benzidine		1.8 U	2.1 U
	2-Methylphenol		1.4 U	1.6 U
h	1,2-Dichlorobenzene		1.4 U	1.6 U
	o-Chlorophenol		1.4 U	1.6 U
	2,4,5-Trichlorophenol		1.4 U	1.6 U
	Nitrobenzene		1.4 U	1.6 U
	3-Nitroaniline		1.4 U	1.6 U
	4-Nitroaniline		3.6 U	4.1 U
i	4-Nitrophenol		3.6 U	4.1 UJ
	Benzyl Alcohol		44.0	1.6 U
p	4-Bromophenyl Phenylether		1.4 U	1.6 U
	2,4-Dimethylphenol		1.4 U	1.6 U
	4-Methylphenol		1.4 U	1.6 U
h	1,4-Dichlorobenzene		1.4 U	1.6 U
	4-Chloroaniline		1.4 U	1.6 U
	Phenol		19.3	3.3
	Pyridine		1.4 U	1.6 U
j	Bis(2-Chloroethyl)Ether		1.4 U	1.6 U
j	Bis(2-Chloroethoxy)Methane		1.4 U	1.6 U
i	Bis(2-Ethylhexyl)Phthalate		1.4 U	1.6 U
i	Di-n-Octyl Phthalate		1.4 U	1.6 U
g	Hexachlorobenzene		1.4 U	1.6 U
n	Anthracene		1.4 U	1.6 U
g	1,2,4-Trichlorobenzene		1.4 U	1.6 U
	2,4-Dichlorophenol		1.4 U	1.6 U
o	2,4-Dinitrotoluene		3.6 U	4.1 U
	1,2-Diphenylhydrazine		2.9 U	3.3 U
n	Pyrene		1.4 U	1.6 U
i	Dimethyl Phthalate		1.4 U	1.6 U
	Dibenzofuran		1.4 U	1.6 U
n	Benzo(g,h,i)Perylene		1.4 U	1.6 U
n	Indeno(1,2,3-cd)Pyrene		1.4 U	1.6 U
n	Benzo(b)Fluoranthene		1.4 U	1.6 U
n	Fluoranthene		1.4 U	1.6 U
n	Benzo(k)Fluoranthene		1.4 U	1.6 U
n	Acenaphthylene		1.4 U	1.6 U
n	Chrysene		1.4 U	1.6 U
	Retene		1.4 U	1.3 U
i	4,6-Dinitro-2-Methylphenol		14.5 U	16.5 U
h	1,3-Dichlorobenzene		1.4 U	1.6 UJ
o	2,6-Dinitrotoluene		3.6 U	4.1 U
k	N-Nitroso-di-n-Propylamine		1.4 U	1.6 U
p	4-Chlorophenyl Phenylether		1.4 U	1.6 U
j	Bis(2-Chloroisopropyl)Ether		1.4 U	1.6 U

Appendix F - (cont'd) - Port Townsend Paper, 1993.

Pesticide/PCB Compounds		Location: Type: Date: Time: Lab Log#:	Inf-E comp 11/16-17 0800-0800 478282 µg/L	Eff-E comp 11/16-17 0800-0800 478290 µg/L
u	4,4'-DDT		0.045 UJ	0.052 UJ
v	Chlordane		0.45 UJ	0.52 UJ
q	gamma-BHC (Lindane)		0.045 U	0.052 UJ
	Dieldrin		0.045 U	0.052 UJ
t	Endrin		0.045 U	0.052 UJ
	Methoxychlor		0.045 UJ	0.052 UJ
u	4,4'-DDD		0.045 U	0.052 UJ
u	4,4'-DDE		0.045 U	0.052 UJ
r	Heptachlor		0.045 U	0.052 UJ
	Aldrin		0.045 UJ	0.052 UJ
q	alpha-BHC		0.045 U	0.052 UJ
q	beta-BHC		0.045 U	0.052 UJ
q	delta-BHC		0.045 U	0.052 UJ
s	Endosulfan I		0.045 U	0.052 UJ
r	Heptachlor Epoxide		0.045 U	0.052 UJ
s	Endosulfan Sulfate		0.045 U	0.052 UJ
t	Endrin Aldehyde		0.45 U	0.052 UJ
	Toxaphene		1.4 U	1.6 UJ
w	Aroclor-1260		0.45 U	0.52 UJ
w	Aroclor-1254		0.45 U	0.52 UJ
w	Aroclor-1221		0.45 U	0.52 UJ
w	Aroclor-1232		0.45 U	0.52 UJ
w	Aroclor-1248		0.45 U	0.52 UJ
w	Aroclor-1016		0.45 U	0.52 UJ
s	Endosulfan II		0.045 U	0.052 UJ
w	Aroclor-1242		0.45 U	0.52 UJ
t	Endrin Ketone		0.045 U	0.052 UJ

Metals**		Location: Type: Date: Time: Lab Log#:	Inf-E comp 11/16-17 0800-0800 478282 µg/L	Eff-E comp 11/16-17 0800-0800 478290 µg/L	Eff-P comp 11/16-17 0800-0800 478291 µg/L
	Antimony		30 U	30 U	30 U
	Arsenic		3.3 P	2.4 P	2.0 P
	Beryllium		1.1 P	1 U	1 U
	Cadmium		0.42 P	0.12 P	0.13 P
	Chromium		9.3 P	5 U	5 U
	Hexavalent				
	Trivalent				
	Copper		19 P	11 P	14 P
	Lead		9.3 P	2.2 P	2.0 P
	Mercury (total)		0.053 P	0.05 U	0.05 U
	Nickel		26 P	10 U	10 U
	Selenium		2.0 U	2.0 U	2.0 U
	Silver		0.50 U	0.50 U	0.50 U
	Thallium		2.5 UN	2.5 UN	2.5 UN
	Zinc		70.3	16 P	23 P

** total recoverable unless otherwise specified

NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

- U - The analyte was not detected at or above the reported result.
- UJ - The analyte was not detected at or above the reported estimated result.
- UN - The analyte was not detected at or above the reported result. The spike sample recovery is not within control limits.
- J - The analyte was positively identified. The associated numerical result is an estimate.
- B - Analyte was found in the analytical method blank, indicating the sample may have been contaminated.
- P - The analyte was detected above the instrument detection limit but below the established quantitation limit.

- | | | | |
|---|---|---|---|
| a | Total Halomethanes | m | Total Chlorinated Naphthalenes |
| b | Total Dichloroethenes | n | Total Polynuclear Aromatic Hydrocarbons |
| c | Total Trichloroethanes | o | Total Dinitrotoluenes |
| d | Total Dichloropropanes | p | Total Haloethers |
| e | Total Dichloropropenes | q | Total BHCs |
| f | Total Tetrachloroethanes | r | Heptachlor |
| g | Total Chlorinated Benzenes (excluding Dichlorobenzenes) | s | Endosulfan |
| h | Total Dichlorobenzenes | t | Endrin |
| i | Total Phthalate Esters | u | DDT plus metabolites |
| j | Total Chloroalkyl Ethers | v | Total Chlordane |
| k | Total Nitrosamines | w | Total Aroclors (PCBs) |

Inf - influent sample
Eff - effluent sample
grab - grab sample
comp - composite sample

E - Ecology
P - Port Townsend Paper

— detected analyte

Appendix G - Sediment VOA, BNA, Pesticide/PCB and Metals Scan Results - Port Townsend Paper, 1993.

VOA Compounds	Location:		Sed-1		Sed-2		Sed-3	
	Type:	grab	grab	grab	grab	grab	grab	grab
	Date:	12/15	12/15	12/15	12/15	12/15	12/15	12/15
	Time:	1225	1400	1400	1400	1510	1510	1510
Lab Log #:		498325	498326	498327	498328	498329	498330	498331
		ug/Kg-dry wt	ug/Kg-dry wt	ug/Kg-dry wt	ug/Kg-dry wt	ug/Kg-dry wt	ug/Kg-dry wt	ug/Kg-dry wt
Carbon Tetrachloride		5.4 U	7.0 U	3.0 U	3.0 U			
Acetone		84.3 UJ	73.2 UJ	36.1 UJ	36.1 UJ			
Chloroform		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
Benzene		5.4 U	7.0 U	3.0 U	3.0 U			
1,1,1-Trichloroethane		5.4 U	7.0 U	3.0 U	3.0 U			
Bromomethane		5.4 U	7.0 U	3.0 U	3.0 U			
Chloromethane		5.4 U	7.0 U	3.0 U	3.0 U			
Dibromomethane		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
Bromochloromethane		5.4 U	7.0 U	3.0 U	3.0 U			
Chloroethane		5.4 U	7.0 U	3.0 U	3.0 U			
Vinyl Chloride		5.4 U	7.0 U	3.0 U	3.0 U			
Methylene Chloride		6.5 UJ	7.4 UJ	4.0 UJ	4.0 UJ			
Carbon Disulfide		8.2 UJ	7.9 UJ	3.7 UJ	3.7 UJ			
Bromoform		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
Bromodichloromethane		5.4 UJ	7.0 U	3.0 U	3.0 U			
1,1-Dichloroethane		5.4 U	7.0 U	3.0 U	3.0 U			
1,1-Dichloroethene		5.4 U	7.0 U	3.0 U	3.0 U			
Trichlorofluoromethane		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
Dichlorodifluoromethane		5.4 U	7.0 U	3.0 U	3.0 U			
1,2-Dichloropropane		54.4 UJ	70.3 U	30.2 U	30.2 U			
2-Butanone (MEK)		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
1,1,2-Trichloroethane		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
Trichloroethene		5.4 U	7.0 U	3.0 U	3.0 U			
1,1,2,2-Tetrachloroethane		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
1,2,3-Trichlorobenzene		5.4 U	7.0 U	3.0 U	3.0 U			
Hexachlorobutadiene		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
Naphthalene		5.4 U	7.0 U	3.0 U	3.0 U			
o-Xylene		5.4 U	7.0 U	3.0 U	3.0 U			
2-Chlorotoluene		5.4 U	7.0 U	3.0 U	3.0 U			
1,2-Dichlorobenzene		5.4 U	7.0 U	3.0 U	3.0 U			
1,2,4-Trimethylbenzene		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
1,2-Dibromo-3-Chloropropane (DBGP)		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
1,2,3-Trichloropropane		5.4 UJ	7.0 U	3.0 U	3.0 U			
tert-Butylbenzene		5.4 UJ	7.0 U	3.0 U	3.0 U			
Isopropylbenzene		5.4 U	7.0 U	3.0 U	3.0 U			
p-Isopropyltoluene		5.4 U	7.0 U	3.0 U	3.0 U			
Ethylbenzene		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
Ethyl-Benzene		5.4 UJ	7.0 U	3.0 U	3.0 U			
Propylbenzene		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
Butylbenzene		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
4-Chlorotoluene		5.4 U	7.0 U	3.0 U	3.0 U			
1,4-Dichlorobenzene		5.4 U	7.0 U	3.0 U	3.0 U			
1,2-Dibromoethane (EDB)		5.4 UJ	7.0 UJ	3.0 UJ	3.0 UJ			
1,2-Dichloroethane		5.4 U	7.0 U	3.0 U	3.0 U			
4-Methyl-2-Pentanone (MIBK)		54.4 UJ	70.3 UJ	30.2 UJ	30.2 UJ			
1,3,5-Trimethylbenzene		5.4 U	7.0 U	3.0 U	3.0 U			
Bromobenzene		5.4 U	7.0 U	3.0 U	3.0 U			
Toluene		5.4 U	7.0 U	3.0 U	3.0 U			
Chlorobenzene		5.4 U	7.0 U	3.0 U	3.0 U			

Appendix G - (cont'd) - Port Townsend Paper, 1993.

Location: Sed-1 Sed-2 Sed-3
 Type: grab grab grab
 Date: 12/15 12/15 12/15
 Time: 1225 1400 1510
 Lab Log #: 498325 498326 498327
 ug/Kg-dry wt ug/Kg-dry wt ug/Kg-dry wt

VOA Compounds (cont'd)

1,2,4-Trichlorobenzene	5.4 UJ	7.0 UJ	3.0 UJ
Dibromochloromethane	5.4 UJ	7.0 UJ	3.0 UJ
Tetrachloroethene	5.4 U	7.0 U	3.0 U
sec-Butylbenzene	5.4 U	7.0 U	3.0 U
1,3-Dichloropropane	5.4 UJ	7.0 UJ	3.0 UJ
cis-1,2-Dichloroethene	5.4 U	7.0 U	3.0 U
trans-1,2-Dichloroethene	5.4 U	7.0 U	3.0 U
1,3-Dichlorobenzene	5.4 U	7.0 U	3.0 U
1,1-Dichloropropene	5.4 U	7.0 U	3.0 U
2-Hexanone	218 UJ	281 UJ	121 UJ
2,2-Dichloropropane	5.4 U	7.0 U	3.0 U
1,1,1,2-Tetrachloroethane	5.4 U	7.0 U	3.0 U
Total Xylenes	16.3 U	21.1 U	9.0 U
m,p-Xylene	5.4 U	7.0 U	3.0 U
cis-1,3-Dichloropropene	5.4 UJ	7.0 U	3.0 U
trans-1,3-Dichloropropene	5.4 UJ	7.0 UJ	3.0 UJ

Appendix G - (cont'd) - Port Townsend Paper, 1993.

BNA Compounds	Location:		Sed-1		Sed-2		Sed-3	
	Type:	grab	grab	grab	grab	grab	grab	grab
	Date:	12/15	12/15	12/15	12/15	12/15	12/15	12/15
Lab Log #:	498325		498326		498327		498327	
	ug/Kg-dry wt		ug/Kg-dry wt		ug/Kg-dry wt		ug/Kg-dry wt	
Phenol		730 U	360 U	710 U				
Bis(2-Chloroethyl)Ether		730 U	360 U	710 U				
2-Chlorophenol		730 U	360 U	710 U				
1,3-Dichlorobenzene		730 U	360 U	710 U				
1,4-Dichlorobenzene		730 U	360 U	710 U				
1,2-Dichlorobenzene		730 U	360 U	710 U				
2-Methylphenol		730 U	360 U	710 U				
2,2-Oxybis(1-Chloropropane)		730 U	360 U	710 U				
4-Methylphenol		730 U	360 U	710 U				
N-Nitroso-di-n-Propylamine		730 U	360 U	710 U				
Hexachloroethane		730 U	360 U	710 U				
Nitrobenzene		730 U	360 U	710 U				
Isophorone		730 U	360 U	710 U				
2-Nitrophenol		730 U	360 U	710 U				
2,4-Dimethylphenol		730 U	360 U	710 U				
Bis(2-Chloroethoxy)Methane		730 U	360 U	710 U				
2,4-Dichlorophenol		730 U	360 U	710 U				
1,2,4-Trichlorobenzene		730 U	360 U	710 U				
Naphthalene		730 U	360 U	710 U				
4-Chloroaniline		730 U	360 U	710 U				
Hexachlorobutadiene		730 U	360 U	710 U				
4-Chloro-3-Methylphenol		730 U	360 U	710 U				
2-Methylnaphthalene		730 U	360 U	710 U				
Hexachlorocyclopentadiene		730 U	360 U	710 U				
2,4,6-Trichlorophenol		730 U	360 U	710 U				
2,4,5-Trichlorophenol		1800 U	870 U	1700 U				
2-Chloronaphthalene		730 U	360 U	710 U				
2-Nitroaniline		1800 U	870 U	1700 U				
Dimethyl Phthalate		730 U	360 U	710 U				
Acenaphthylene		730 U	360 U	710 U				
2,6-Dinitrotoluene		730 U	360 U	710 U				
3-Nitroaniline		1800 U	870 U	1700 U				
Acenaphthene		730 U	360 U	710 U				
2,4-Dinitrophenol		1800 U	870 U	1700 U				
4-Nitrophenol		1800 U	870 U	1700 U				
Dibenzofuran		730 U	360 U	710 U				
2,4-Dinitrotoluene		730 U	360 U	710 U				
Diethyl Phthalate		730 U	360 U	710 U				
4-Chlorophenyl Phenylether		730 U	360 U	710 U				
Fluorene		730 U	360 U	710 U				
4-Nitroaniline		1800 U	870 U	1700 U				
4,6-Dinitro-2-Methylphenol		1800 U	870 U	1700 U				
N-Nitrosodiphenylamine		730 U	360 U	710 U				
4-Bromophenyl Phenylether		730 U	360 U	710 U				
Hexachlorobenzene		730 U	360 U	710 U				
Pentachlorophenol		1800 U	870 U	1700 U				
Phenanthrene		730 U	360 U	710 U				
Anthracene		730 U	360 U	710 U				
Carbazole		730 U	360 U	710 U				
Di-n-Butyl Phthalate		730 U	360 U	710 U				

Appendix G - (cont'd) - Port Townsend Paper, 1993.

Location: Sed-1 Sed-2 Sed-3
 Type: grab grab grab
 Date: 12/15 12/15 12/15
 Time: 1225 1400 1510
 Lab Log #: 498325 498326 498327
 BNA Compounds (cont'd) ug/Kg-dry wt ug/Kg-dry wt ug/Kg-dry wt

Fluoranthene	180 J	90 J	710 U
Pyrene	170 J	100 J	710 U
Butylbenzyl Phthalate	730 U	360 U	710 U
3,3'-Dichlorobenzidine	730 U	360 U	710 U
Benzo(a)Anthracene	110 J	72 J	710 U
Chrysene	200 J	140 J	710 U
Bis(2-Ethylhexyl) Phthalate	730 U	360 U	710 U
Di-n-Octyl Phthalate	730 U	360 U	710 U
Benzo(b)Fluoranthene	230 J	90 J	710 U
Benzo(k)Fluoranthene	730 U	360 U	710 U
Benzo(a)Pyrene	730 U	54 J	710 U
Indeno(1,2,3-cd)Pyrene	730 U	360 U	710 U
Dibenzof(a,h)Anthracene	730 U	360 U	710 U
Benzo(g,h,i)Perylene	730 U	360 U	710 U
Benzy/ Alcohol	1800 U	910 U	1800 U
Benzoic Acid			

Appendix G -- (cont'd) -- Port Townsend Paper, 1993.

Pesticide/PCB Compounds	Location:		Sed-1		Sed-2		Sed-3	
	Type:	grab	grab	grab	grab	grab	grab	grab
	Date:	12/15	12/15	12/15	12/15	12/15	12/15	12/15
	Time:	1225	1400	1400	1400	1510	1510	1510
Lab Log#:	498325	498325	498326	498326	498327	498327	498327	498327
	ug/Kg-dry wt	ug/Kg-dry wt	ug/Kg-dry wt	ug/Kg-dry wt	ug/Kg dry-wt	ug/Kg dry-wt	ug/Kg dry-wt	ug/Kg dry-wt
alpha-BHC	5.0 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
beta-BHC	6.2 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
delta-BHC	5.0 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
gamma-BHC (Lindane)	5.0 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
Heptachlor	5.0 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
Aldrin	5.0 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
Heptachlor Epoxide	5.0 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
Endosulfan I	5.0 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
Dieldrin	9.7 U	4.8 U	4.8 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
4,4'-DDE	9.7 U	4.8 U	4.8 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
Endrin	9.7 U	4.8 U	4.8 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
Endosulfan II	9.7 U	4.8 U	4.8 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
4,4'-DDD	9.7 U	4.8 U	4.8 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
Endosulfan Sulfate	9.7 U	4.8 U	4.8 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
4,4'-DDT	9.7 U	4.8 U	4.8 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
Methoxychlor	50 U	25 U	25 U	47 U	47 U	47 U	47 U	47 U
Endrin Ketone	9.7 U	4.8 U	4.8 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
Endrin Aldehyde	9.7 U	4.8 U	4.8 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U
alpha-Chlordane	5.0 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
gamma-Chlordane	5.0 U	2.5 U	2.5 U	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
Toxaphene	500 U	250 U	250 U	470 U	470 U	470 U	470 U	470 U
Aroclor-1016	97 U	48 U	48 U	92 U	92 U	92 U	92 U	92 U
Aroclor-1221	200 U	97 U	97 U	190 U	190 U	190 U	190 U	190 U
Aroclor-1232	97 U	48 U	48 U	92 U	92 U	92 U	92 U	92 U
Aroclor-1242	97 U	48 U	48 U	92 U	92 U	92 U	92 U	92 U
Aroclor-1248	97 U	48 U	48 U	92 U	92 U	92 U	92 U	92 U
Aroclor-1254	97 U	48 U	48 U	92 U	92 U	92 U	92 U	92 U
Aroclor-1260	97 U	48 U	48 U	92 U	92 U	92 U	92 U	92 U

Appendix G – (cont'd) – Port Townsend Paper, 1993.

Location: Sed-1 Sed-2 Sed-3
 Type: grab grab grab
 Date: 12/15 12/15 12/15
 Time: 1225 1400 1510
 Lab Log#: 498325 498326 498327
 mg/Kg-dry wt mg/Kg-dry wt mg/Kg-dry wt

Metals

Antimony	3	UJ	3	UJ	3	UJ
Arsenic	7.97		8.05		3.15	
Pentavalent						
Trivalent						
Cadmium	0.528		0.558		0.301	
Chromium	39		39.4		21.1	
Hexavalent						
Trivalent						
Copper	44.3		38		11.3	
Lead	17.6	J	18.4	J	4.41	J
Mercury	0.047	J	0.044	J	0.048	J
Nickel	33.8		33.6		27.1	
Selenium	0.92	P	0.82	P	0.40	U
Silver	0.16	P	0.16	P	0.10	U
Thallium	0.50	U	0.50	U	0.50	U
Zinc	86.8		80.9		31.8	

– detected analyte

- U – The analyte was not detected at or above the reported result.
- UJ – The analyte was not detected at or above the reported estimated result.
- J – The analyte was positively identified. The associated numerical result is an estimate.
- P – The analyte was detected above the instrument detection limit but below the established minimum quantitation limit.

Sed-1 – near the downstream end of the diffuser at a depth of 53 feet
 Sed-2 – near the upstream end of the diffuser at a depth of 46 feet
 Sed-3 – background station 1/2 mile south of the diffuser off of Old Fort Townsend State Park

Appendix H – VOA and BNA Scan Tentatively Identified Compounds (TICs) –
Port Townsend Paper, 1993.

Tic data are presented on the laboratory report sheets that follow. VOA fractions are identified as VOA or volatile organics. BNA fractions are identified as B/N/Acid or semivolatile organics. Locations corresponding to the Lab Log# (called Sample No. on the laboratory report sheet) and data qualifiers are summarized on this page. If sheets are not included for a station, no TICs were detected.

Location:	Inf-E	Inf-1	Inf-2	Eff-E	Eff-1	Eff-2
Type:	comp	grab	grab	comp	grab	grab
Date:	11/16-17	11/16	11/16	11/16-17	11/16	11/16
Time:	0800-0800	1010	1525	0800-0800	1150	1600
Lab Log#:	478282	478280	478281	478290	478287	478288

Location:	Sed-1	Sed-2	Sed-3
Type:	grab	grab	grab
Date:	12/15	12/15	12/15
Time:	1225	1400	1510
Lab Log#:	478325	478326	478327

Inf – influent
Eff – effluent
Sed – sediment
comp – composite sample
grab – grab sample
E – Ecology sample

Project: DOE-927Y PORT TOWNSEND PAPER

Laboratory: Ecology, Manchester

Sample No: 93 478280

Description: INF-1

Begin Date: 93/11/16 :

Tent Ident - VOA Sca	Water-Total Result Units
Methanethiol	79.2NJ* ug/l
METHANE, THIOBIS	1440NJ* ug/l
PROPANAL, 2-METHYL-	1.7NJ* ug/l
CAMPHERE (DOT)	3.1NJ* ug/l
3-PENTANONE	7.7NJ* ug/l
1,3-CYCLOHEXADIENE, 1-+	7.0NJ* ug/l
2-PENTANONE	17.7NJ* ug/l
.BETA.-MYRCENE	2.6NJ* ug/l
Propanal	5.3NJ* ug/l
BUTANAL	5.0NJ* ug/l
FURAN, 2-METHYL-	0.78NJ* ug/l
CYCLOHEXENE, 1-METHYL-+	18.5NJ* ug/l
DISULFIDE, DIMETHYL	895NJ* ug/l
BICYCLO[2.2.1]HEPTAN-2+	21.0NJ* ug/l
Disulfide, methyl 2-pr+	4.4NJ* ug/l
BICYCLO[3.1.0]HEX-2-EN+	3.1NJ* ug/l
TRISULFIDE, DIMETHYL	37.4NJ* ug/l
BICYCLO[2.2.1]HEPTAN-2+	3.6NJ* ug/l
4-CARENE, (1S,3R,6R)-(+	5.1NJ* ug/l
D-LIMONENE	12.0NJ* ug/l
CYCLOPENTENE, 1-ISOPRO+	35.8NJ* ug/l
1-PROPENE, 3-(METHYLTH+	3.7NJ* ug/l
3-CARENE	6.6NJ* ug/l
3-Cyclohexen-1-ol, 4-m+	9.1NJ* ug/l
Methyl ethyl disulphide	1.4NJ* ug/l
1,6-Octadien-3-ol, 3,7+	5.8NJ* ug/l
CYCLOPROPANE, 1,1-DIME+	5.1NJ* ug/l

Project: DOE-927Y PORT TOWNSEND PAPER

Laboratory: Ecology, Manchester

Sample No: 93 478281

Description: INF-2

Begin Date: 93/11/16

Tent Ident - VOA Sca	Water-Total Result Units
Methanethiol	183NJ* ug/l
Acetaldehyde	48.7NJ* ug/l
METHANE, THIOBIS	1170NJ* ug/l
PROPANAL, 2-METHYL-	1.5NJ* ug/l
CAMPHERE (DOT)	15.5NJ* ug/l
.ALPHA.-PINENE	16.7NJ* ug/l
3-PENTANONE	10.5NJ* ug/l
1,3-CYCLOHEXADIENE, 1-+	78.8NJ* ug/l
2-PENTANONE	14.8NJ* ug/l
2-HEPTANONE	6.8NJ* ug/l
.BETA.-MYRCENE	8.7NJ* ug/l
Propanal	9.1NJ* ug/l
BUTANAL	5.7NJ* ug/l
BICYCLO[2.2.1]HEPTAN-2+	14.3NJ* ug/l
FURAN, 2-METHYL-	1.2NJ* ug/l
3-CYCLOHEXEN-1-OL, 4-M+	27.2NJ* ug/l
CYCLOHEXENE, 1-METHYL-+	73.5NJ* ug/l
BUTANAL, 3-METHYL-	1.5NJ* ug/l
DISULFIDE, DIMETHYL	916NJ* ug/l
BICYCLO[2.2.1]HEPTAN-2+	90.1NJ* ug/l
BICYCLO[3.1.0]HEX-2-EN+	45.6NJ* ug/l
TRISULFIDE, DIMETHYL	140NJ* ug/l
BICYCLO[2.2.1]HEPTAN-2+	9.6NJ* ug/l
D-LIMONENE	53.7NJ* ug/l
CYCLOPENTENE, 1-ISOPRO+	120NJ* ug/l
1-PROPENE, 3-(METHYLTH+	4.7NJ* ug/l
3-CARENE	54.2NJ* ug/l
Methyl ethyl disulphide	2.0NJ* ug/l
BENZENE, METHYL(1-METH+	18.9NJ* ug/l
ETHANONE, 1-(METHYLPHE+	118NJ* ug/l
Benzo[c]thiophene, oct+	2.4NJ* ug/l

Project: DOE-927Y PORT TOWNSEND PAPER

Laboratory: Ecology, Manchester

Sample No: 93 478282

Description: INF-E

Begin Date: 93/11/17

Tent Ident - B/N/Aci	Water-Total Result Units
Linoleic acid	56.8NJ* ug/l
.ALPHA.-PINENE	1120NJ* ug/l
.GAMMA.-SITOSTEROL	14.5NJ* ug/l
Guaicol (2-methoxyphen+	1690NJ* ug/l
3-CYCLOHEXENE-1-METHAN+	792NJ* ug/l
Oleic acid	31.4NJ* ug/l
BENZALDEHYDE, 4-HYDROX+	454NJ* ug/l
.BETA.-PINENE	234NJ* ug/l
LIMONENE	258NJ* ug/l
1,6,10-DODECATRIEN-3-O+	149NJ* ug/l
BORNEOL	232NJ* ug/l
ETHANONE, 1-(4-HYDROXY+	239NJ* ug/l
BENZENE, 1,2,3,5-TETRA+	101NJ* ug/l
3-CYCLOHEXEN-1-OL, 4-M+	498NJ* ug/l
DISULFIDE, DIMETHYL	3790NJ* ug/l
1,3,6,10-CYCLOTETRADEC+	133NJ* ug/l
Phenol, 4-ethyl-2-meth+	189NJ* ug/l
BENZENE, 2-ETHYL-1,3-D+	218NJ* ug/l
TRISULFIDE, DIMETHYL	116NJ* ug/l
1-Naphthalenepropanol, +	356NJ* ug/l
1-PHENANTHRENECARBOXYL+	58.6NJ* ug/l
Cyclohexene, 3-methyl-+	385NJ* ug/l
UNKNOWN HYDROCARBON 1	68.0NJ* ug/l
UNKNOWN HYDROCARBON 2	14.4NJ* ug/l
UNKNOWN HYDROCARBON 3	36.4NJ* ug/l
UNKNOWN HYDROCARBON 4	11.1NJ* ug/l
UNKNOWN HYDROCARBON 5	14.1NJ* ug/l
UNKNOWN COMPOUND 1	223NJ* ug/l
UNKNOWN COMPOUND 2	29.1NJ* ug/l
3-CARENE	130NJ* ug/l
Bicyclo[4.1.0]heptane, +	141NJ* ug/l
2,4-Hexadiene, 3,4-dim+	104NJ* ug/l
BICYCLO[3.1.0]HEX-2-EN+	258NJ* ug/l
2-CYCLOPENTEN-1-ONE, 2+	154NJ* ug/l

Project: DOE-927Y PORT TOWNSEND PAPER
 Laboratory: Ecology, Manchester
 Sample No: 93 478287 Description: EFF-1
 Begin Date: 93/11/16 :

Tent Ident - VOA Sca	Water-Total Result Units
DISULFIDE, DIMETHYL	2.9NJ* ug/l

Project: DOE-927Y PORT TOWNSEND PAPER
 Laboratory: Ecology, Manchester
 Sample No: 93 478288 Description: EFF-2
 Begin Date: 93/11/16 :

Tent Ident - VOA Sca	Water-Total Result Units
DISULFIDE, DIMETHYL	0.88NJ* ug/l

Project: DOE-927Y PORT TOWNSEND PAPER

Laboratory: Ecology, Manchester

Sample No: 93 478290

Description: EFF-E

Begin Date: 93/11/17

Tent Ident - B/N/Aci	Water-Total	
	Result	Units
. GAMMA - SITOSTEROL	13.8NJ*	ug/l
Stigasterol	4.8NJ*	ug/l
PHENOL, 2-METHOXY-4-ME+	5.8NJ*	ug/l
ETHANOL, 2-(2-BUTOXYET+	16.3NJ*	ug/l
ETHANOL, 2-(2-BUTOXYET+	26.0NJ*	ug/l
DISULFIDE, DIMETHYL	1.2NJ*	ug/l
Ethanone, 1-(4-hydroxy+	6.6NJ*	ug/l
UNKNOWN HYDROCARBON 1	4.4NJ*	ug/l
UNKNOWN HYDROCARBON 1	10.5NJ*	ug/l
UNKNOWN HYDROCARBON 3	7.0NJ*	ug/l
UNKNOWN COMPOUND 1	20.2NJ*	ug/l
UNKNOWN COMPOUND 2	20.2NJ*	ug/l
UNKNOWN COMPOUND 3	133NJ*	ug/l
UNKNOWN COMPOUND 4	11.2NJ*	ug/l
UNKNOWN COMPOUND 5	4.8NJ*	ug/l
UNKNOWN COMPOUND 6	4.2NJ*	ug/l
UNKNOWN COMPOUND 7	5.1NJ*	ug/l
UNKNOWN COMPOUND 8	3.3NJ*	ug/l
UNKNOWN COMPOUND 9	15.6NJ*	ug/l
UNKNOWN COMPOUND 10	6.6NJ*	ug/l
UNKNOWN COMPOUND 11	3.9NJ*	ug/l
UNKNOWN COMPOUND 12	5.1NJ*	ug/l

Sample No: 93 498325

Description: SED-1

Begin Date: 93/12/15 :

Tent Ident - VOA Sca	Sediment Result Units
METHANE, THIOBIS	6.0NJ* ug/kg
CYCLOTRISILOXANE, HEXA+	7.6NJ* ug/kg
CYCLOTETRAILOXANE, OC+	3.7NJ* ug/kg

Sample No: 93 498326

Description: SED-2

Begin Date: 93/12/15 :

Tent Ident - VOA Sca	Sediment Result Units
METHANE, THIOBIS	44.0NJ* ug/kg
CYCLOTRISILOXANE, HEXA+	11.2NJ* ug/kg
CYCLOTETRAILOXANE, OC+	2.7NJ* ug/kg

Sample No: 93 498327

Description: SED-3

Begin Date: 93/12/15 :

Tent Ident - VOA Sca	Sediment Result Units
METHANE, THIOBIS	5.9NJ* ug/kg
CYCLOTRISILOXANE, HEXA+	6.1NJ* ug/kg

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

498325

Lab Name: Analytical Resources, Inc Contract:

Lab Code: ARI

Case No.: WDOE

SAS No.:

SDG No.: F900

Matrix: (soil/water) SOIL

Lab Sample ID: F900A

Sample wt/vol: 39.8 (g/mL) G

Lab File ID: F900A

Level: (low/med) LOW

Date Received: 12/16/93

% Moisture: 66. decanted: (Y/N) Y

Date Extracted: 12/22/93

Concentrated Extract Volume: 1000.0 (uL)

Date Analyzed: 01/06/94

Injection Volume: 2.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y

pH: 7.3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 20

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN BP 55	23.95	2000.	J
2.	UNKNOWN BP 43	24.20	900.	J
3.	UNKNOWN BP 136	25.70	500.	J
4.	UNKNOWN BP 43	28.98	300.	J
5.	UNKNOWN BP 43	30.30	1000.	J
6.	UNKNOWN HYDROCARBON	31.10	400.	J
7.	UNKNOWN HYDROCARBON	32.33	800.	J
8.	UNKNOWN STEROL BP 43	35.70	600.	J
9.	UNKNOWN STEROL BP 43	35.98	1000.	J
10.	UNKNOWN BP 165	36.10	900.	J
11.	UNKNOWN STEROL BP 69	36.35	600.	J
12.	UNKNOWN STEROL BP 43	36.90	1000.	J
13.	UNKNOWN BP 124	37.00	600.	J
14.	UNKNOWN STEROL BP 55	37.12	600.	J
15.	UNKNOWN BP 43	37.43	700.	J
16.	UNKNOWN STEROL BP 43	37.55	3000.	J
17.	UNKNOWN BP 55	37.63	1000.	J
18.	UNKNOWN BP 43	37.80	500.	J
19.	UNKNOWN BP 43	37.90	2000.	J
20.	UNKNOWN BP 55	38.15	800.	J
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FORM I SV-TIC

3/90

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

498326

Lab Name: Analytical Resources, Inc Contract:

Lab Code: ARI

Case No.: WDOE

SAS No.:

SDG No.: F900

Matrix: (soil/water) SOIL

Lab Sample ID: F900B

Sample wt/vol: 39.9 (g/mL) G

Lab File ID: F900B

Level: (low/med) LOW

Date Received: 12/16/93

% Moisture: 31. decanted: (Y/N) Y

Date Extracted: 12/22/93

Concentrated Extract Volume: 1000.0 (uL)

Date Analyzed: 01/06/94

Injection Volume: 2.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y

pH: 7.3

CONCENTRATION UNITS:

Number TICs found: 20

(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN BP 55	23.95	900.	NJ
2.	UNKNOWN BP 43	24.20	500.	J
3.	UNKNOWN BP 43	28.97	200.	J
4.	UNKNOWN BP 69	30.30	200.	J
5.	UNKNOWN HYDROCARBON	30.35	200.	J
6.	UNKNOWN BP 43	31.03	300.	J
7.	UNKNOWN HYDROCARBON	31.10	200.	J
8.	UNKNOWN HYDROCARBON	32.33	300.	J
9.	UNKNOWN BP 69	35.43	200.	J
10.	UNKNOWN BP 43	35.70	300.	J
11.	UNKNOWN STEROL BP 43	35.98	700.	J
12.	UNKNOWN BP 165	36.10	400.	J
13.	UNKNOWN BP 69	36.35	300.	J
14.	UNKNOWN STEROL BP 43	36.90	300.	J
15.	UNKNOWN BP 43	37.00	300.	J
16.	UNKNOWN BP 43	37.43	300.	J
17.	UNKNOWN STEROL BP 43	37.55	1000.	J
18.	UNKNOWN BP 43	37.63	500.	J
19.	UNKNOWN BP 69	37.90	600.	J
20.	UNKNOWN BP 207	38.15	400.	J
21.				
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FORM I SV-TIC

3/90

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

498327

Lab Name: Analytical Resources, Inc Contract:

Lab Code: ARI

Case No.: WDOE

SAS No.:

SDG No.: F900

Matrix: (soil/water) SOIL

Lab Sample ID: F900C

Sample wt/vol: 39.5 (g/mL) G

Lab File ID: F900C

Level: (low/med) LOW

Date Received: 12/16/93

% Moisture: 65. decanted: (Y/N) Y

Date Extracted: 12/22/93

Concentrated Extract Volume: 1000.0 (uL)

Date Analyzed: 01/06/94

Injection Volume: 2.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y

pH: 7.3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 20

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN BP 55	23.93	700.	NJ
2.	UNKNOWN BP 43	24.18	600.	J
3.	UNKNOWN BP 69	26.07	400.	J
4.	UNKNOWN BP 57	30.35	700.	J
5.	UNKNOWN BP 69	31.10	300.	J
6.	UNKNOWN BP 57	32.33	400.	J
7.	UNKNOWN BP 43	35.43	300.	J
8.	UNKNOWN BP 55	35.70	300.	J
9.	UNKNOWN STEROL BP 43	35.98	1000.	J
10.	UNKNOWN BP 165	36.10	500.	J
11.	UNKNOWN STEROL BP 69	36.35	400.	J
12.	UNKNOWN BP 55	36.83	300.	J
13.	UNKNOWN STEROL BP 43	36.90	400.	J
14.	UNKNOWN BP 124	37.00	400.	J
15.	UNKNOWN BP 43	37.55	1000.	J
16.	UNKNOWN BP 55	37.68	900.	J
17.	UNKNOWN BP 55	37.80	300.	J
18.	UNKNOWN BP 69	37.90	800.	J
19.	UNKNOWN BP 43	37.98	200.	J
20.	UNKNOWN BP 207	38.15	300.	J
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FORM I SV-TIC

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Appendix I - Glossary of Terms - Port Townsend Paper, 1993.

BOD	- biochemical oxygen demand
BNA	- base-neutral acids (semivolatile organics)
COD	- chemical oxygen demand
comp	- composite sample
E	- Department of Ecology
Eff	- effluent
EPA	- United States Environmental Protection Agency
F-coli	- fecal coliform bacteria
g	- gram
grab	- grab sample
grab-comp	- grab-composite sample
Inf	- influent
LC50	- concentration which is lethal to 50% of the test organisms
MF	- membrane filter
MPN	- most probable number
mg	- milligram
mg/L	- milligram per liter
NOEC	- no observable effect concentration
NPDES	- National Pollutant Discharge Elimination System
P	- Port Townsend Paper Corporation sample
pH	- hydrogen ion concentration
PTPC	- Port Townsend Paper Corporation
QA	- quality assurance
QC	- quality control
Sed	- sediment sample
TIC	- tentatively identified compound
TNVS	- total nonvolatile solids
TNVSS	- total nonvolatile suspended solids
TOC	- total organic carbon
Total-P	- total phosphorus
TS	- total solids
TSS	- total suspended solids
μ	- microgram
μ /L	- microgram per liter
VOA	- volatile organic